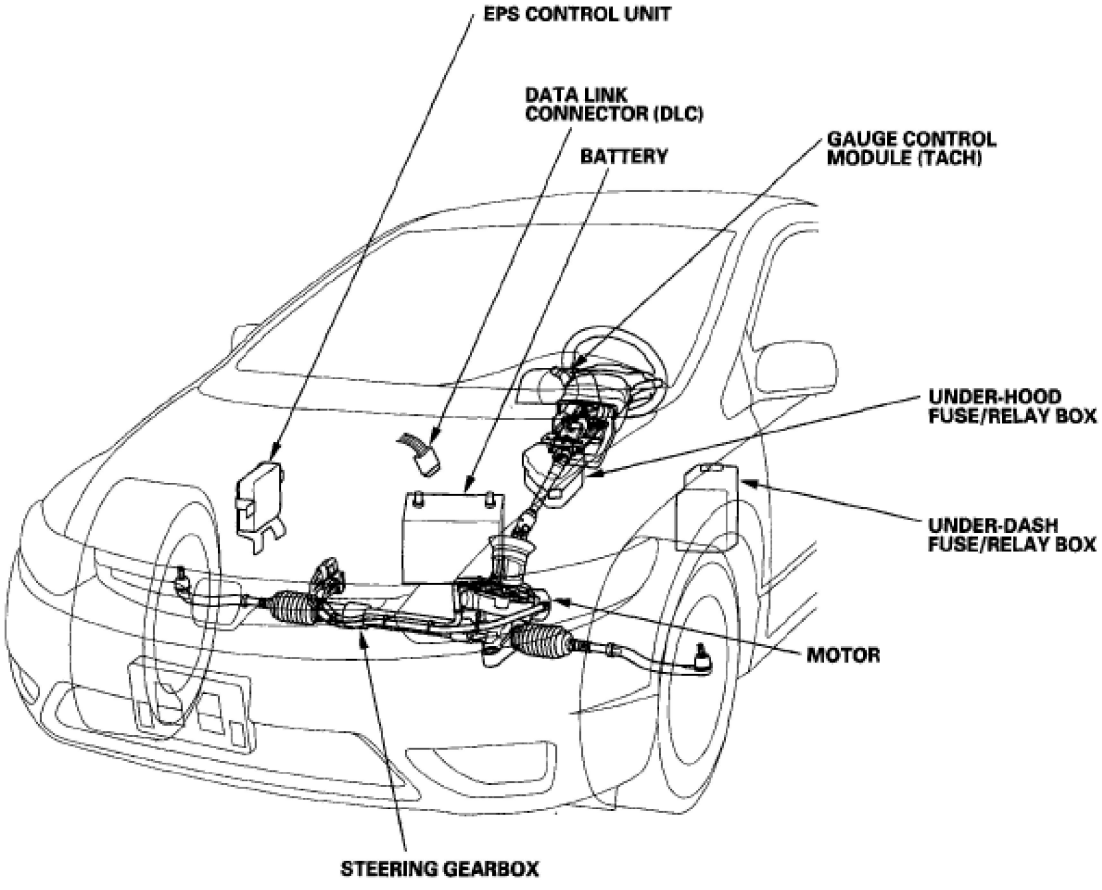
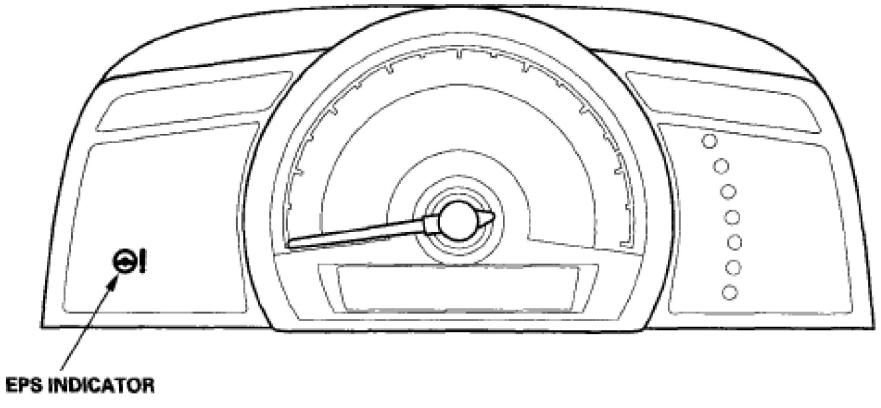
## 2006-08 STEERING

## EPS System - Civic (All Except Hybrid & Si)

# COMPONENT LOCATION INDEX



## Fig. 1: Locating EPS Components

## GENERAL TROUBLESHOOTING INFORMATION

**EPS INDICATOR**

Under normal conditions, the EPS indicator comes on when the ignition switch is turned to the ON (II) position, then goes off after the engine is started. This indicates that the LED and its circuit are operating correctly. If there is a failure in the system after the engine is started, the EPS indicator will stay on, and the power assist is turned off.

When the EPS indicator comes on, the control unit memorizes the DTC. In this case, the control unit will not activate the EPS system after the engine starts again, but it keeps the EPS indicator on.

When DTC 51-01, 51-02 or 51-06 is stored in the control unit, the EPS indicator will stay on until the DTC is erased. When a problem is detected and the EPS indicator comes on, there are cases when the indicator stays on until the ignition switch is turned OFF, and cases when the indicator goes off automatically when the system returns to normal. Even though the system is operating normally, the EPS indicator will come on under the following conditions:

- The vehicle speed decreases abruptly from 12mph (20 km/h) or more (by applying brake), and it is less than 1 mph (1 km/h) and engine speed is 2,000 rpm or above for 5 seconds (continuously) after the abrupt deceleration.
- While turning the steering wheel with the vehicle speed of 1 mph (1 km/h) or less for 20 seconds, and the engine speed is 2,000 rpm or above for at least 10 seconds.
- When the engine speed is 500 rpm or less, and the vehicle is travelling at a speed of 6 mph (10 km/h) or more for about 3 seconds.

To determine the actual cause of the problem, question the customer about the conditions during which the problem occured, taking the above conditions into consideration.

**DIAGNOSTIC TROUBLE CODE (DTC)**

- If the CPU cannot be activated, or it fails, the EPS indicator comes on, but the DTC is not memorized.
- The memory can hold any number of DTCs. However, when the same DTC is detected more than once, the most recent DTC is written over the prior DTC, therefore only one occurance is memorized.
- The lowest DTC is indicated first. The DTCs are indicated in ascending order, not in the order that they occurred.
- The DTCs are memorized in the EEPROM (nonvolatile memory) therefore the memorized DTCs cannot be erased by disconnecting the battery. Perform the specified procedures to clear DTCs.

**SELF-DIAGNOSIS**

Self-diagnosis can be classified into three categories:

- Initial diagnosis: Done right after the engine starts and until the EPS indicator goes off.
- Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned OFF.
- Steering diagnosis: Done during regular diagnosis while turning steering wheel.

The EPS control unit performs the following functions when a problem is detected by self-diagnosis:

1. Turns on the EPS indicator.
2. Memorizes the DTC.
3. Stops power assist and manual steering operation resumes.

**NOTE: For DTCs 11-01, 11-02, 12-01,21-01,21-02, 22-01 and 35-04 the EPS indicator will go off automatically, and the system returns to normal.**

**RESTRICTION ON POWER ASSIST OPERATION**

Repeated extreme steering force, such as turning the steering wheel continuously

back-and-forth with the vehicle stopped, causes an increase of power consumption in the EPS motor. The increase of electric current causes the motor to heat up. Because this heat adversely affects the system, the control unit monitors the electric current of the motor.

When the control unit detects heat build-up in the motor, it reduces the electric current to the motor gradually to protect the system, and it restricts the power assist operation. The EPS indicator does not come on during this function.

When steering torque is not applied to the steering wheel, or when the ignition is turned off and the motor cools, the control unit will restore the power assist gradually until it's fully restored (after about 8 minutes).

#### TORQUE SENSOR NEUTRAL POSITION

The EPS control unit stores the torque sensor neutral position in the EEPROM. The torque sensor neutral position must be memorized whenever the gearbox, the motor, or the EPS control unit is replaced.

**NOTE: The torque sensor neutral position is not effected when erasing the DTCs.**

#### HOW TO TROUBLESHOOT DTCS

The troubleshooting procedures assume that the cause of the problem is still present and the EPS indicator is still on. Following the procedure when the EPS indicator does not come on can result in incorrect diagnosis.

1. Question the customer about the conditions when the problem occured, and try to reproduce the same conditions for troubleshooting. Find out when the EPS indicator came on, such as during EPS control, after EPS control, when the vehicle was at a certain speed, etc.
2. When the EPS indicator does not come on during the test-drive, but troubleshooting is done based on the DTC, check for loose connectors, poor terminal contact, etc., in the affected circuit before you start troubleshooting.
3. After troubleshooting, clear the DTC and test-drive the vehicle. Be sure the EPS indicator does not come on.

**HOW TO RETRIEVE DTCS**

1. With the ignition switch to LOCK (0), connect the HDS (Honda diagnostic system) to the data link connector (DLC) (A) located under the driver's side of the dashboard.

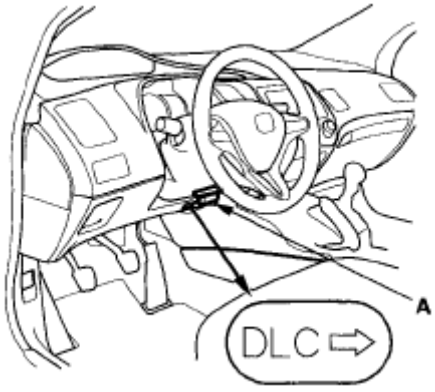



**Fig. 2: Identifying DLC Connector**

2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the EPS control unit. If it doesn't, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING** ).
4. Follow the prompts on the HDS to display the DTC(s) on the screen. After determining the DTC, refer to the **DTC TROUBLESHOOTING**.

**NOTE: See the HDS Help menu for specific instructions.**

5. Turn the ignition switch to LOCK (0).

**HOW TO CLEAR DTCS**

1. With the ignition switch in LOCK (0) position, connect the HDS to the data link connector (DLC) (A) located under the driver's side of the dashboard.

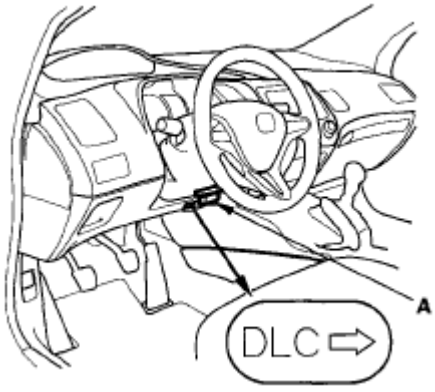



**Fig. 3: Identifying DLC Connector**

2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the EPS control unit. If it doesn't, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING** ).
4. Clear the DTC(s) by following the screen prompts on the HDS.

**NOTE: See the HDS Help menu for specific instructions.**

5. Turn the ignition switch to LOCK (0).

## MEMORIZING THE TORQUE SENSOR NEUTRAL POSITION

The torque sensor neutral position must be memorized whenever the gearbox, the motor, or the EPS control unit is replaced. Note that the torque sensor neutral position is not affected when erasing the DTC.

**NOTE: The torque sensor is sensitive to temperature. This procedure should be performed within the range of 68℉ ± 50℉ (20℃ ± 10℃).**

1. With the ignition switch in LOCK (0) position, connect the HDS to the data link connector (DLC) (A) located under the driver's side of the dashboard.

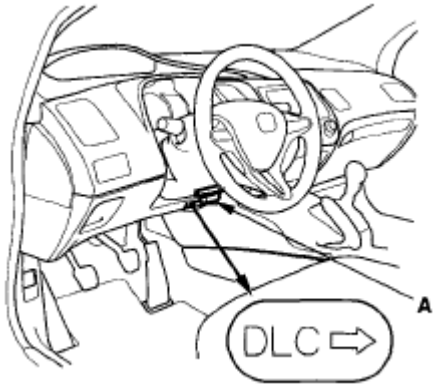



**Fig. 4: Identifying DLC Connector**

2. Turn the ignition switch ON (II).
3. Make sure the HDS communicates with the vehicle and the EPS control unit. If it doesn't, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING** ).
4. From the EPS MENU, select MISCELLANEOUS TEST then TORQUE SENSOR LEARN and follow the screen prompts on the HDS.

**NOTE: See the HDS Help menu for specific instructions.**

5. Turn the ignition switch to LOCK (0).

## DTC TROUBLESHOOTING INDEX

## DTC TROUBLESHOOTING INDEX

| DTC | Detection Item |
|---|---|
| **11-01** | Low/high IG1-terminal voltage (Initial diagnosis) |
| **11-02** | Low/high IG1-terminal voltage (Regular diagnosis) |
| **12-01** | Low/high VBU voltage (Regular diagnosis) |
| **21-01** | Excessive change of the vehicle speed signal (Regular diagnosis) |
| **21-02** | Comparison between the vehicle speed |

| | |
|---|---|
| | and the engine speed signal (Regular diagnosis) |
| **22-01** | Engine speed signal (Initial diagnosis) |
| 31-01 | No writing the torque sensor neutral position (Initial diagnosis) |
| **32-01** | EPS control unit internal circuit (current sensor) (Initial diagnosis) |
| **32-02** | EPS control unit internal circuit (current sensor) (Regular diagnosis) |
| **32-07** | EPS control unit internal circuit (current sensor) (Steering diagnosis) |
| **32-08** | Current sensor (Regular diagnosis) |
| **32-09** | Current sensor (Initial diagnosis) |
| **33-01** | Lower FET stuck ON (Initial diagnosis) |
| **33-02** | Upper FET stuck ON (Initial diagnosis) |
| **33-06** | Lower FET stuck ON (Regular diagnosis) |
| **33-07** | Upper FET stuck ON (Regular diagnosis) |
| **34-01** | Power relay stuck ON (IG switch is OFF) |
| **34-02** | Fail-safe relay stuck ON (Initial diagnosis) |
| **35-01** | EPS control unit internal circuit (CPU) (Initial diagnosis/regular diagnosis) |
| **35-02** | EPS control unit internal circuit (EEPROM) (Initial diagnosis) |
| **35-03** | EPS control unit internal circuit (EPS CPU) (Initial diagnosis) |
| **35-04** | EPS control unit internal circuit (CPU communication) (Regular diagnosis) |
| **35-05** | EPS control unit internal circuit (Motor/EPS CPU) (Initial diagnosis) |

| | |
|---|---|
| **35-06** | EPS control unit internal circuit (ITN communication) (Regular diagnosis) |
| **35-07** | EPS control unit internal circuit (INHL/INHR ports) (Initial diagnosis/regular diagnosis) |
| **36-02** | EPS control unit internal circuit (INH output circuit) (Initial diagnosis) |
| **37-01** | EPS control unit internal circuit (Step-up circuit) (Initial diagnosis) |
| **51-01** | Low/high voltage for the torque sensor (VT1 and VT2) (Regular diagnosis) |
| **51-02** | Torque sensor (VT3 Differential-amplification Function) (Regular diagnosis) |
| **51-03** | Torque sensor (VT1, VT2 rapid change) (Regular diagnosis) |
| **51-06** | Torque sensor (VT1, VT2 average) (Regular diagnosis) |
| **51-07** | Torque sensor (VT1, VT2 initial check) (Initial diagnosis) |
| **61-04** | Open/short in the motor harness (Steering diagnosis) |
| **71-01** | Motor angle sensor (SIN/COS signals) (Steering diagnosis) |
| **71-02** | Motor angle sensor (neutral position learning of SIN/COS) (Initial diagnosis) |
| **71-03** | Motor angle sensor (SIN/COS signals) (Steering diagnosis) |
| **71-04** | Motor angle sensor (check signal) (Regular diagnosis) |
| **71-05** | Motor angle sensor (SIN/COS signals changing amount) (Steering diagnosis) |
| **71-06** | Motor angle sensor (neutral position of |

| | |
|---|---|
| | SIN/COS) (Initial diagnosis) |

**NOTE:**

- **Initial diagnosis: Done right after the engine starts and until the EPS indicator goes off.**
- **Regular diagnosis: Done right after the initial diagnosis until the ignition switch is turned off.**
- **Steering diagnosis: Done during regular diagnosis while turning steering wheel.**

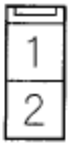
## SYMPTOM TROUBLESHOOTING INDEX

## SYMPTOM TROUBLESHOOTING INDEX

| Symptom | Diagnostic procedure |
|---|---|
| EPS indicator does not come on | Symptom Troubleshooting (see **EPS INDICATOR DOES NOT COME ON** ) |
| EPS indicator does not go off, and no DTCs are stored | Symptom Troubleshooting (see **EPS INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED** ) |
| EPS indicator is not on, no DTCs are stored, but there is no power assist or power assist is down | 1. Check the motor power wires between the EPS control unit and the motor for a short to body ground. Repair as needed.<br>2. If the motor power wires are OK, replace the motor (short in the motor) (see **MOTOR REMOVAL AND INSTALLATION** ).<br>3. Check the power and ground connections at the EPS control unit. |
| HDS does not communicate with the EPS control unit or the vehicle | Troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING** ). |

## SYSTEM DESCRIPTION

### EPS CONTROL UNIT INPUTS AND OUTPUTS FOR CONNECTOR A (2P)



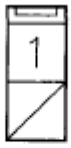

Wire side of female terminals

**Fig. 5: Identifying EPS Control Unit Inputs And Outputs For Connector A (2P)**

## SYSTEM DESCRIPTION

| Terminal number | Wire color | Terminal sign (Terminal name) | Description | Signal | | |
|---|---|---|---|---|---|---|
| | | | | Terminals | Conditions | Voltage |
| 1 | BLK | PG (Power ground) | Ground for the actuator motor | - | - | - |
| 2 | WHT | +B (Plus battery) | Power source for the actuator motor | 2-GND | At all times | Battery voltage |

**EPS CONTROL UNIT INPUTS AND OUTPUTS FOR CONNECTOR B (2P)**




Wire side of female terminals

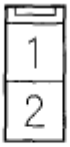
**Fig. 6: Identifying EPS Control Unit Inputs And Outputs For Connector B (2P)**

## TERMINAL NUMBER REFERENCE

| Terminal number | Wire color | Terminal sign (Terminal name) | Description | Signal | | |
|---|---|---|---|---|---|---|
| | | | | Terminals | Conditions | Voltage |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | GRIM | H-W | Drives the actuator motor | - | - | - |

**EPS CONTROL UNIT INPUTS AND OUTPUTS FOR CONNECTOR C (2P)**



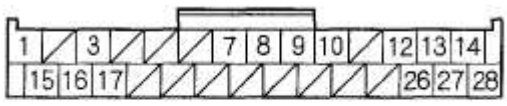

Wire side of female terminals

**Fig. 7: Identifying EPS Control Unit Inputs And Outputs For Connector C (2P)**

## TERMINAL NUMBER REFERENCE

| Terminal number | Wire color | Terminal sign (Terminal name) | Description | Signal | | |
|---|---|---|---|---|---|---|
| | | | | Terminals | Conditions | Voltage |
| 1 | RED | H-U | Drives the actuator motor | - | - | - |
| 2 | BLU | H-V | Drives the actuator motor | - | - | - |

**EPS CONTROL UNIT INPUTS AND OUTPUTS FOR CONNECTOR D (28P)**




Wire side of female terminals

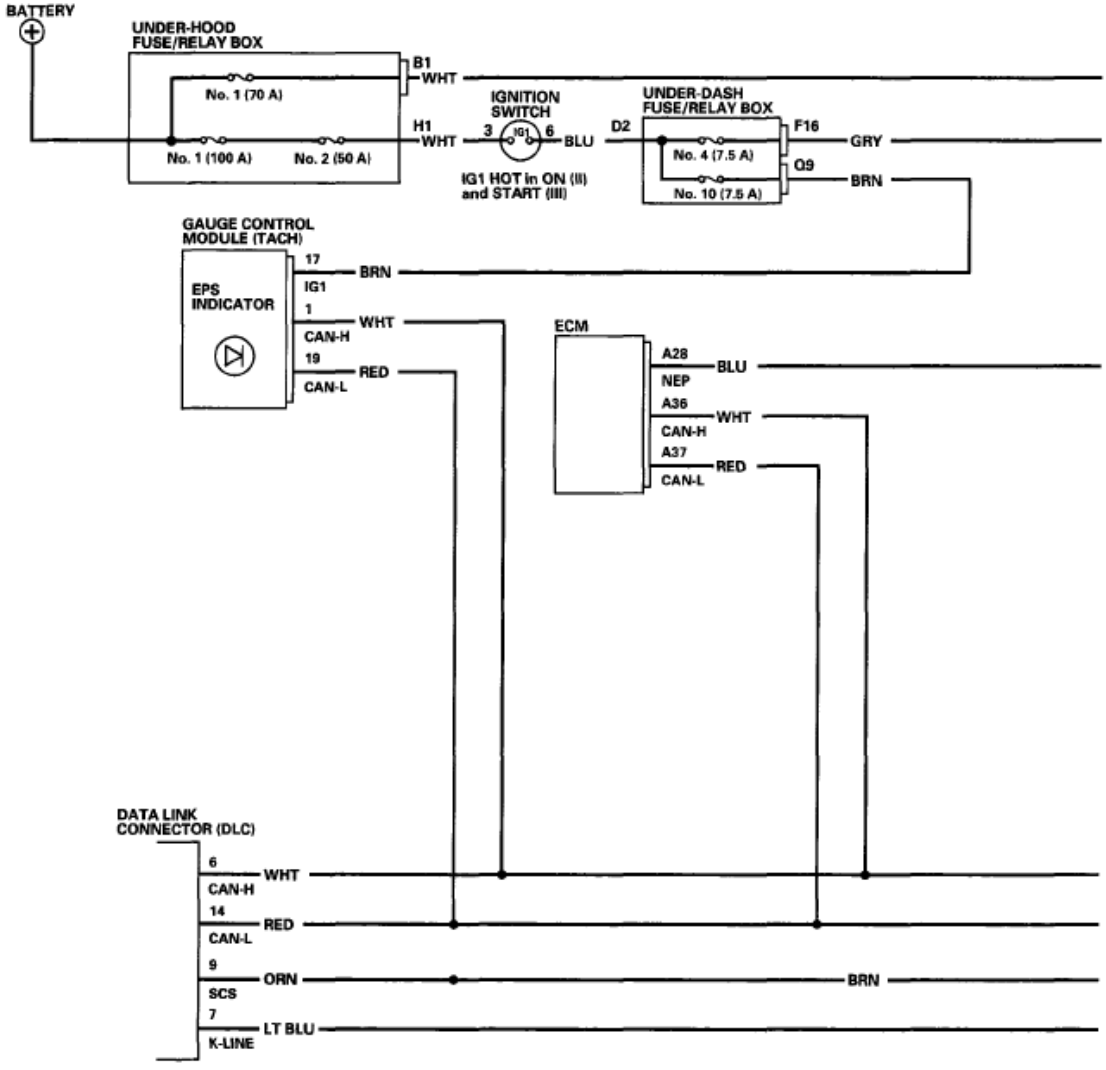
**Fig. 8: Identifying EPS Control Unit Inputs And Outputs For Connector D (28P)**

## TERMINAL NUMBER REFERENCE

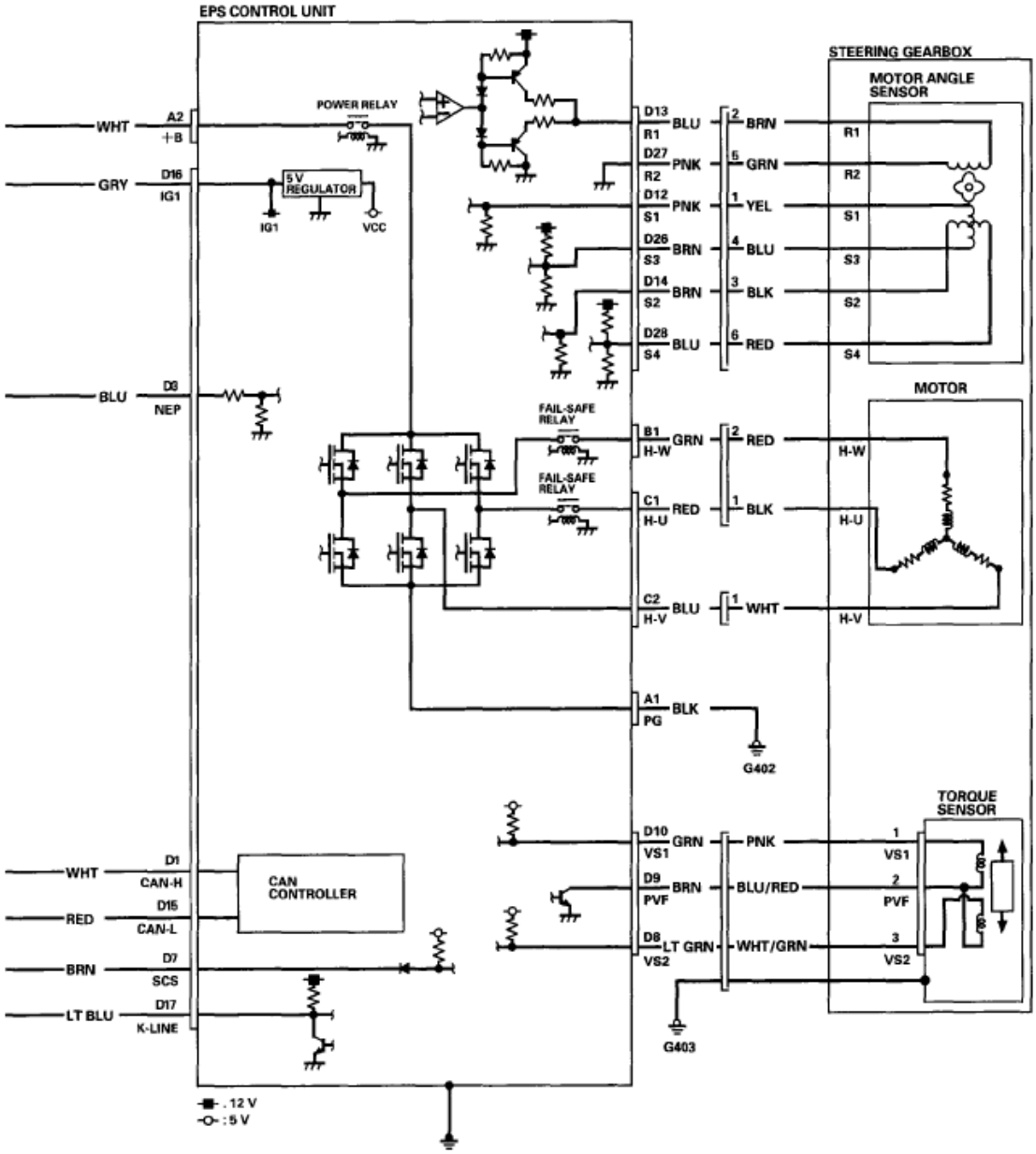
| Terminal number | Wire color | Terminal sign (Terminal name) | Description | Signal | | |
|---|---|---|---|---|---|---|
| | | | | Terminals | Conditions | Voltage |
| 1 | WHT | CAN-H (CAN-HI) | CAN communication circuit | - | - | - |
| 3 | BLU | NEP (Engine pulse) | Detects tachometer signal | 3-GND | With engine running | 3 V or less-6 V or more |
| 7 | BRN | SCS (Service check signal) | Detects service check connector signal | 7-GND | SCS not grounded | About 5 V |
| 8 | LT GRN | VS2 (Voltage sensor 2) | Detects torque sensor signal | - | - | - |
| 9 | BRN | PVF (Voltage fade) | Drives the torque sensor | - | - | - |
| 10 | GRN | VS1 (Voltage sensor 1) | Detects torque sensor signal | - | - | - |
| 12 | PNK | S1 (Signal 1) | Detects motor angle sensor signal | - | - | - |
| 13 | BLU | R1 (Motor angle sensor 1) | Detects motor angle sensor signal | - | - | - |
| 14 | BRN | S2 (Signal 2) | Detects motor angle sensor signal | - | - | - |
| | | CAN-L | CAN | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | RED | (CAN-LO) | communication circuit | - | - | - |
| 16 | GRY | IG1 (Ignition 1) | Power source for activating the system | 16-GND | Ignition switch ON (II) | Battery voltage |
| | | | | | Ignition switch OFF | 0 V |
| 17 | LT BLU | K-LINE (Data link connector) | Communicates with HDS | 17-GND | HDS not connected | About 5 V |
| 26 | BRN | S3 (Signal 3) | Detects motor angle sensor signal | - | - | - |
| 27 | PNK | R2 (Motor angle sensor 2) | Detects motor angle sensor signal | - | - | - |
| 28 | BLU | S4 (Signal 4) | Detects motor angle sensor signal | - | - | - |

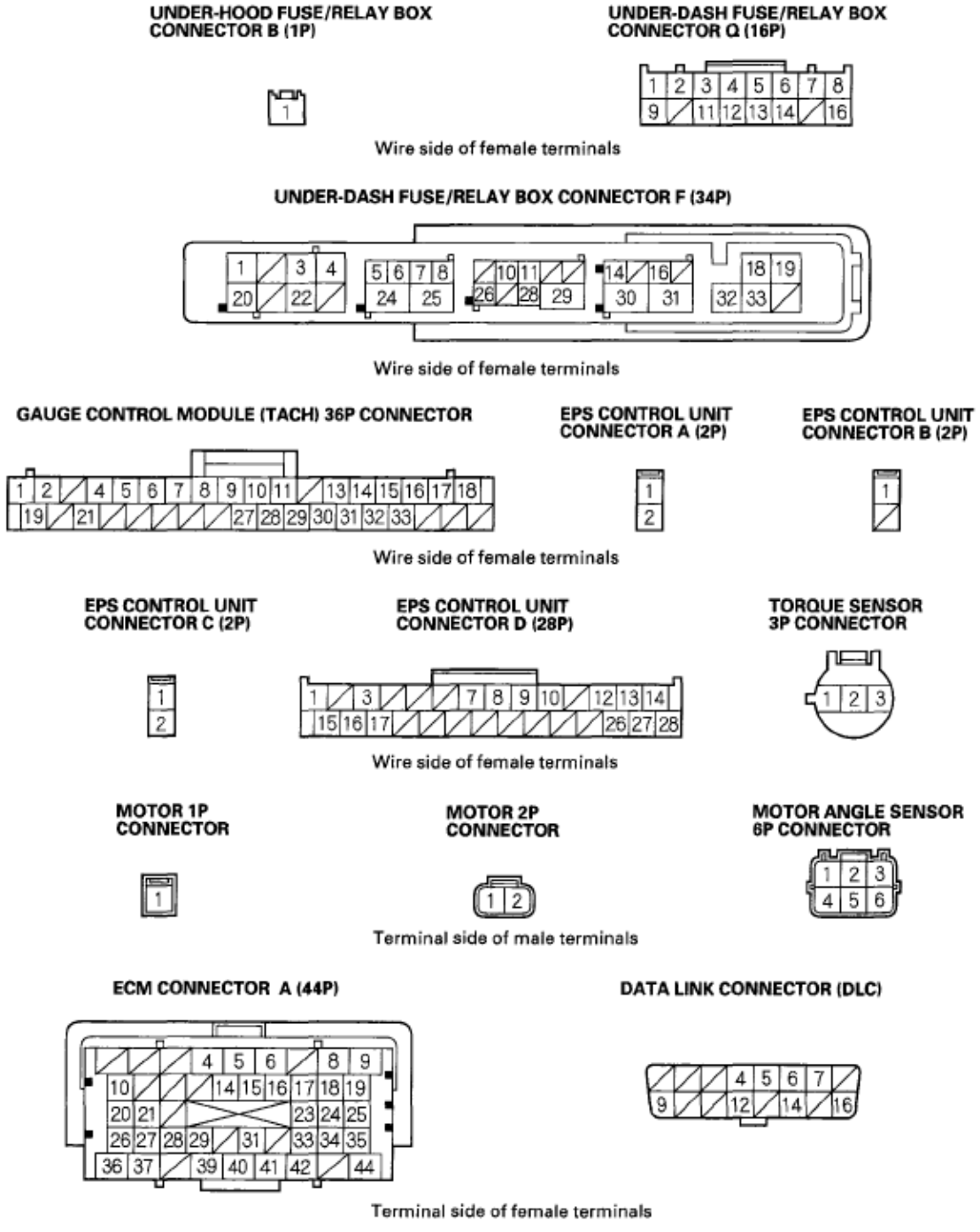
## CIRCUIT DIAGRAM




## Fig. 9: Identifying EPS Circuit Diagram (1 Of 3)




## Fig. 10: Identifying EPS Circuit Diagram (2 Of 3)


UNDER-HOOD FUSE/RELAY BOX CONNECTOR B (1P)
UNDER-DASH FUSE/RELAY BOX CONNECTOR Q (16P)
Wire side of female terminals
UNDER-DASH FUSE/RELAY BOX CONNECTOR F (34P)
Wire side of female terminals
GAUGE CONTROL MODULE (TACH) 36P CONNECTOR
EPS CONTROL UNIT CONNECTOR A (2P)
EPS CONTROL UNIT CONNECTOR B (2P)
Wire side of female terminals
EPS CONTROL UNIT CONNECTOR C (2P)
EPS CONTROL UNIT CONNECTOR D (28P)
TORQUE SENSOR 3P CONNECTOR
Wire side of female terminals
MOTOR 1P CONNECTOR
MOTOR 2P CONNECTOR
MOTOR ANGLE SENSOR 6P CONNECTOR
Terminal side of male terminals
ECM CONNECTOR A (44P)
DATA LINK CONNECTOR (DLC)
Terminal side of female terminals

## Fig. 11: Identifying EPS Circuit Diagram (3 Of 3)

## DTC TROUBLESHOOTING

### DTC 11-01: LOW/HIGH IG1-TERMINAL VOLTAGE (INITIAL DIAGNOSIS)

1. Clear the DTC with the HDS.

2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Wait at least 60 seconds.

   *Does the EPS indicator come on?*

   **YES** -Go to step 5.

   **NO** -Check for loose wires or poor connections. If the connections are good, the system is OK at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control connector D (28P).
7. Turn the ignition switch ON (II).
8. Wait at least 60 seconds.
9. Measure voltage between EPS control unit connector D (28P) terminal No. 16 and body ground.

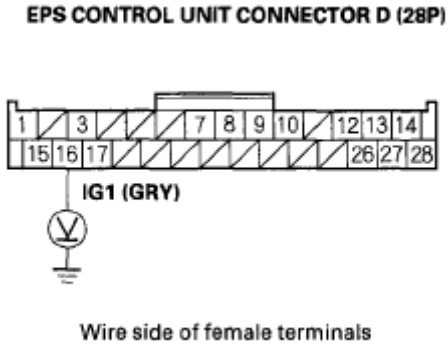



**Fig. 12: Measuring Voltage Between EPS Control Unit Connector D (28P) Terminal No. 16 And Body Ground**

*Is the voltage between 9.63-16.6 V?*

**YES** -Check for loose terminals in the EPS control unit connectors and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -If there is no voltage, or the voltage is lower than specified, repair an open

or high resistance in the wire between the No. 4 (7.5 A) fuse in the under-dash fuse/relay box and EPS control unit. If the wire checks OK, check the battery (see **BATTERY TEST** ), and troubleshoot the alternator regulator circuit (see **ALTERNATOR AND REGULATOR CIRCUIT TROUBLESHOOTING** ).

**DTC 11-02: LOW/HIGH ID-TERMINAL VOLTAGE (REGULAR DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Wait at least 60 seconds.

   *Does the EPS indicator come on?*

   **YES** -Go to step 5.

   **NO** -Check for loose wires or poor connections. If the connections are good, the system is OK at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control connector D (28P).
7. Turn the ignition switch ON (II).
8. Wait at least 60 seconds.
9. Measure voltage between EPS control unit connector D (28P) terminal No. 16 and body ground.

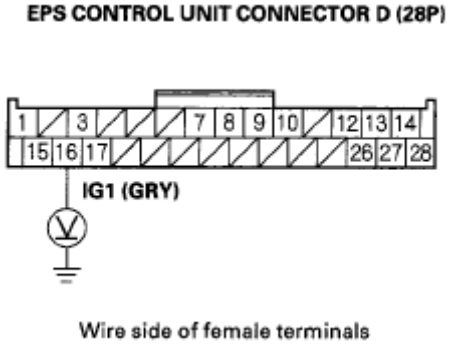



**Fig. 13: Measuring Voltage Between EPS Control Unit Connector D (28P)**

**Terminal No. 16 And Body Ground**

*Is the voltage between 9.20-17.4 V?*

**YES** -Check for loose terminals in the EPS control unit connectors and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -If there is no voltage, or the voltage is lower than specified, repair an open or high resistance in the wire between the No. 4 (7.5 A) fuse in the under-dash fuse/relay box and EPS control unit. If the wire checks OK, check the battery (see **BATTERY TEST** ), and troubleshoot the alternator regulator circuit (see **ALTERNATOR AND REGULATOR CIRCUIT TROUBLESHOOTING** ).

**DTC 12-01: LOW/HIGH VBU VOLTAGE (REGULAR DIAGNOSIS)**

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the data link connector (DLC).
3. Turn the ignition switch ON (II).
4. Check the BATTERY in the DATA LIST with the HDS.

   *Is the voltage at 9.2-17.4 V?*

   **YES** -Check for loose wires or poor connections. If the connections are good, the system is OK at this time.

   **NO** -Go to step 5.

5. Turn the ignition switch to LOCK (0).
6. Check the No. 1 (70 A) fuse in the under-hood fuse/relay box.

   *Is the fuse OK?*

   **YES** -Reinstall the fuse, and go to step 7.

   **NO-Replace** the fuse, and recheck. If the fuse is blown, check for a short to

body ground in this fuse circuit.

7. Disconnect EPS control unit connector A (2P) and connector D (28P).
8. Measure voltage between EPS control unit connector A (2P) terminal No. 2 and body ground.

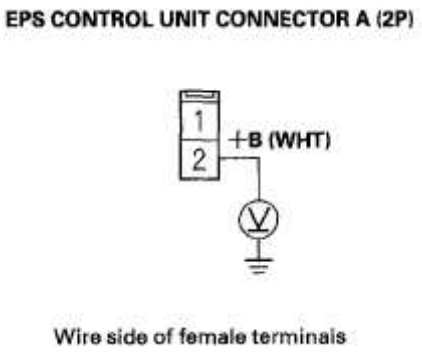



**Fig. 14: Measuring Voltage Between EPS Control Unit Connector A (2P) Terminal No. 2 And Body Ground**

*Is there battery voltage?*

**YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -Repair open in the wire between the EPS control unit and No. 1 (70 A) fuse in the under-hood fuse/relay box.

**DTC 21-01: EXCESSIVE CHANGE OF THE VEHICLE SPEED SIGNAL (REGULAR DIAGNOSIS); DTC 21-02: COMPARISON BETWEEN THE VEHICLE SPEED AND THE ENGINE SPEED SIGNAL (REGULAR DIAGNOSIS)**

**NOTE:**

- **If the MIL indicator is on, troubleshoot the fuel and emissions systems first.**
- **Even though the system is operating normally, the EPS indicator will come on caused by the detecting condition of DTC 21-01 or DTC 21-02.**

1. Turn the ignition switch to LOCK (0).

2. Raise the vehicle, and support it with safety stands in the proper locations (see **LIFT AND SUPPORT POINTS** ), and allow all wheels to rotate freely.
3. Connect the HDS to the data link connector (DLC).
4. Start the engine, run the vehicle in 4th gear.
5. Check the VEHICLE SPEED in the DATA LIST with the HDS.

   *Is the vehicle speed indicated?*

   **YES** -The system is OK at this time.

   **NO** -Go to step 6.

6. Check for DTCs in the fuel and emissions systems with the HDS.

   *Is DTC P0720 indicated?*

   **YES** -Troubleshoot the indicated DTC.

   **NO** -Go to step 7.

7. Start the engine and check the tachometer.

   *Is the tachometer working correctly?*

   **YES** -Go to step 8.

   **NO** -Troubleshoot the gauge control module (tach) (see **SELF-DIAGNOSTIC FUNCTION** ).

8. Turn the ignition switch to LOCK (0).
9. Short the SCS line with the HDS.
10. Disconnect ECM connector A (44P) and EPS control unit connector D (28P).
11. Check for continuity between EPS control unit connector D (28P) terminals No. 1 and ECM connector A (44P) terminals No. 36.

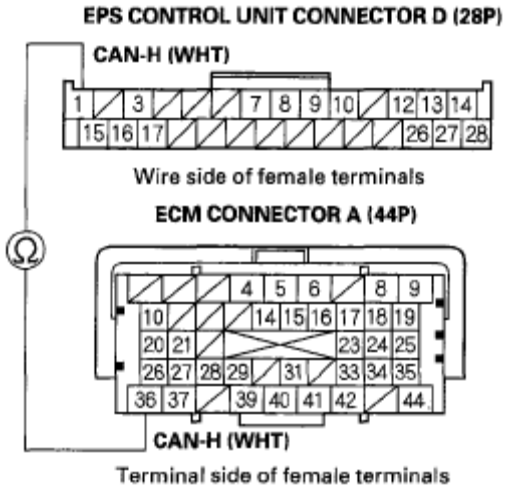

EPS CONTROL UNIT CONNECTOR D (28P)
CAN-H (WHT)
1 3 7 8 9 10 12 13 14
15 16 17 26 27 28
Wire side of female terminals
ECM CONNECTOR A (44P)
4 5 6 8 9
10 14 15 16 17 18 19
20 21 23 24 25
26 27 28 29 31 33 34 35
36 37 39 40 41 42 44
CAN-H (WHT)
Terminal side of female terminals

**Fig. 15: Checking Continuity Between EPS Control Unit Connector D (28P) Terminals No. 1 And ECM Connector A (44P) Terminals No. 36**

*Is there continuity?*

**YES** -Go to step 12.

**NO** -Repair open in the wire between the EPS control unit and the ECM.

12. Check for continuity between EPS control unit connector D (28P) terminals No. 15 and ECM connector A (44P) terminals No. 37.

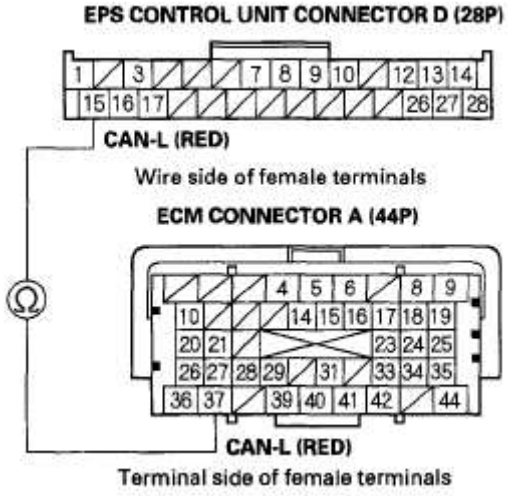

EPS CONTROL UNIT CONNECTOR D (28P)
1 3 7 8 9 10 12 13 14
15 16 17 26 27 28
CAN-L (RED)
Wire side of female terminals
ECM CONNECTOR A (44P)
4 5 6 8 9
10 14 15 16 17 18 19
20 21 23 24 25
26 27 28 29 31 33 34 35
36 37 39 40 41 42 44
CAN-L (RED)
Terminal side of female terminals

**Fig. 16: Checking Continuity Between EPS Control Unit Connector D (28P) Terminals No. 15 And ECM Connector A (44P) Terminals No. 37**

*Is there continuity?*

**YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -Repair open in the wire between the EPS control unit and the ECM.

**DTC 22-01: ENGINE SPEED SIGNAL (INITIAL DIAGNOSIS)**

**NOTE: If the MIL indicator is on, troubleshoot the fuel and emissions systems first.**

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the data link connector (DLC).
3. Start the engine.
4. Check the ENGINE SPEED in the DATA LIST with the HDS.

*Is there 0 rpm at idle?*

**YES** -Go to step 5.

**NO** -The system is OK at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control unit connector D (28P).
7. Start the engine.
8. Measure voltage between EPS control unit connector D (28P) terminal No. 3 and body ground.

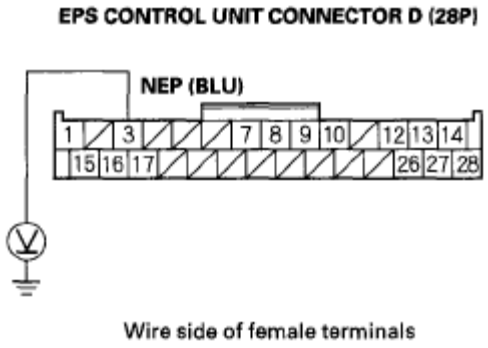



**Fig. 17: Measuring Voltage Between EPS Control Unit Connector D (28P) Terminal No. 3 And Body Ground**

*Is there any voltage?*

**YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -Go to step 9.

9. Turn the ignition switch to LOCK (0).
10. Check for continuity between EPS control unit connector D (28P) terminal No. 3 and body ground.

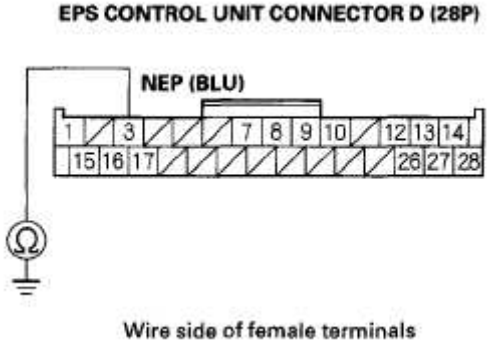



**Fig. 18: Checking Continuity Between EPS Control Unit Connector D (28P) Terminal No. 3 And Body Ground**

*Is there continuity?*

**YES** -Repair short to body ground in the wire between the EPS control unit

and the ECM.

**NO** -Go to step 11.

11. Short the SCS line with the HDS.
12. Disconnect ECM connector A (44P).
13. Check for continuity between EPS control unit connector D (28P) terminals No. 3 and ECM connector A (44P) terminals No. 28.

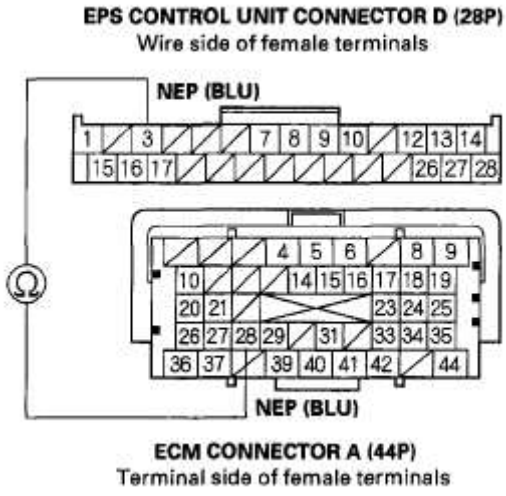

EPS CONTROL UNIT CONNECTOR D (28P)
Wire side of female terminals
NEP (BLU)
1 3 7 8 9 10 12 13 14
15 16 17 26 27 28
4 5 6 8 9
10 14 15 16 17 18 19
20 21 23 24 25
26 27 28 29 31 33 34 35
36 37 39 40 41 42 44
NEP (BLU)
ECM CONNECTOR A (44P)
Terminal side of female terminals

**Fig. 19: Checking Continuity Between EPS Control Unit Connector D (28P) Terminals No. 3 And ECM Connector A (44P) Terminals No. 28**

*Is there continuity?*

**YES** -Check for loose terminals in the ECM connector A (44P), and repair if necessary. If no poor connections are found replace the ECM (see **ECM REPLACEMENT** ).

**NO** -Repair open in the wire between the EPS control unit and the ECM.

**DTC 32-01: EPS CONTROL UNIT INTERNAL CIRCUIT (CURRENT SENSOR) (INITIAL DIAGNOSIS); DTC 32-02: EPS CONTROL UNIT INTERNAL CIRCUIT (CURRENT SENSOR) (REGULAR DIAGNOSIS); DTC 35-01: EPS CONTROL UNIT INTERNAL CIRCUIT (CPU) (INITIAL DIAGNOSIS/REGULAR DIAGNOSIS); DTC 35-02: EPS CONTROL UNIT INTERNAL CIRCUIT (EEPROM) (INITIAL DIAGNOSIS); DTC 35-04: EPS CONTROL UNIT INTERNAL CIRCUIT (CPU COMMUNICATION) (REGULAR DIAGNOSIS); DTC 35-06: EPS CONTROL UNIT INTERNAL CIRCUIT (ITN COMMUNICATION) (REGULAR DIAGNOSIS); DTC 35-07: EPS CONTROL UNIT INTERNAL CIRCUIT (INHL/INHR PORTS) (INITIAL DIAGNOSIS/REGULAR DIAGNOSIS); DTC**

**36-02: EPS CONTROL UNIT INTERNAL CIRCUIT (INH OUTPUT CIRCUIT) (INITIAL DIAGNOSIS); DTC 37-01: EPS CONTROL UNIT INTERNAL CIRCUIT (STEP-UP CIRCUIT) (INITIAL DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.

   *Does the EPS indicator come on?*

   **YES** -Go to step 4.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Check for DTCs with the HDS.

   *Is DTC 32-01, 32-02, 35-01, 35-02, 35-04, 35-06, 35-07, 36-02, or 37-01?*

   **YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

**DTC 32-07: EPS CONTROL UNIT INTERNAL CIRCUIT (CURRENT SENSOR) (STEERING DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Turn the steering wheel to the right or left, and wait 10 seconds or more.

   *Does the EPS indicator come on?*

   **YES** -Go to step 5.

**NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

5. Check for DTCs with the HDS.

   *Is DTC 32-07 indicated?*

   **YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

**DTC 32-08: CURRENT SENSOR (REGULAR DIAGNOSIS); DTC 32-09: CURRENT SENSOR (INITIAL DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Turn the steering wheel to the right or left, and wait 10 seconds or more.

   *Does the EPS indicator come on?*

   **YES** -Go to step 5.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

5. Check for DTCs with the HDS.

   *Is DTC 32-08 or DTC 32-09 indicated?*

   **YES** -Go to step 6.

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector B (2P) and connector C(2P).
8. Check for continuity between the following terminals of the EPS control unit connector B (2P) and connector C (2P).

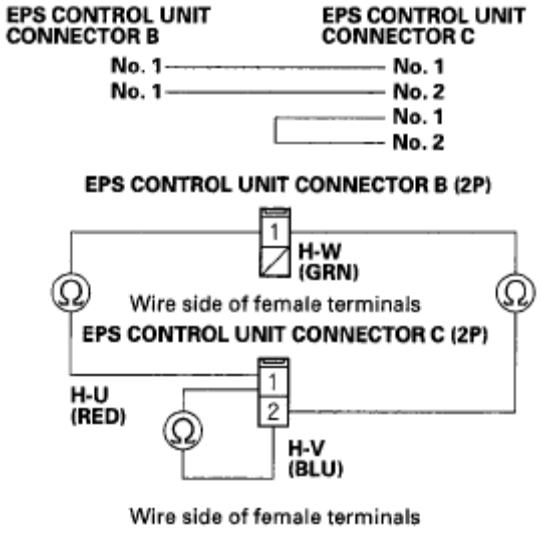



**Fig. 20: Checking Continuity Between Following Terminals Of EPS Control Unit Connector B (2P) And Connector C (2P)**

*Is there continuity?*

**YES** -Check for loose terminals in the EPS control unit connectors and motor connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -Go to step 9.

9. Disconnect the motor 1P connector and motor 2P connector.
10. On the motor side, check for continuity between the following terminals of the motor 1P and motor 2P connector.

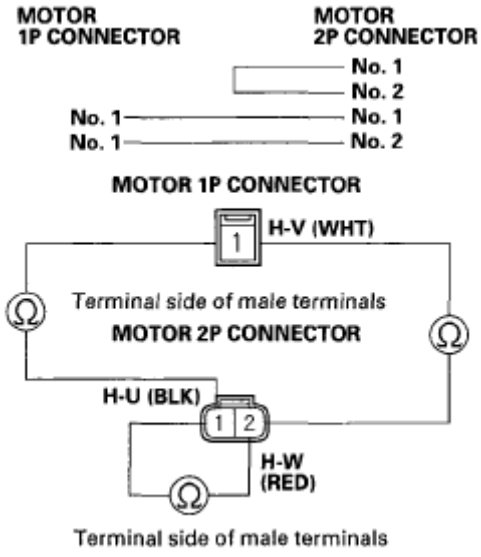



**Fig. 21: Checking Continuity Between Following Terminals Of Motor 1P And Motor 2P Connector**

*Is there continuity?*

**YES** -Repair open in the wire harness between the EPS control unit and motor.

**NO** -Open in the motor wire harness, or motor internal circuit, replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**DTC 33-01: LOWER FET STUCK ON (INITIAL DIAGNOSIS); DTC 33-06: LOWER FET STUCK ON (REGULAR DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.

   *Does the EPS indicator come on?*

   **YES** -Go to step 4.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Check for DTCs with the HDS.

*Is DTC 33-01 or DTC 33-06 indicated?*

**YES** -Go to step 5.

**NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control unit connector B (2P) and connector C(2P).
7. Check for continuity between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, connector C (2P) No. 2 terminal individually.

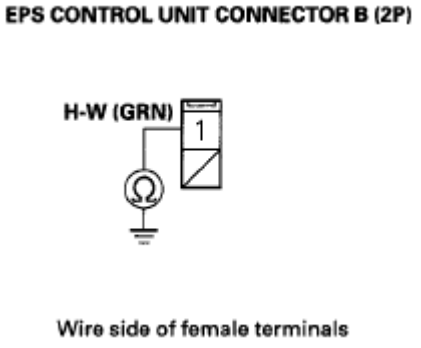



**Fig. 22: Checking Continuity Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

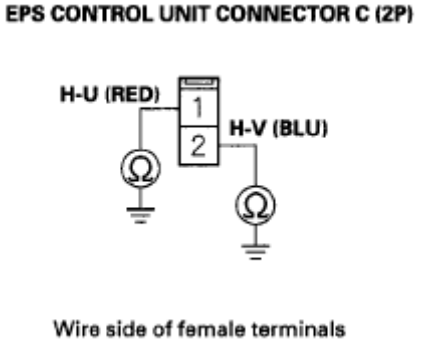



**Fig. 23: Checking Continuity Between Connector C (2P) No. 1 Terminal, Connector C (2P) No. 2**

*Is there continuity?*

**YES** -Go to step 8.

**NO** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

8. Disconnect the motor 1P connector and motor 2P connector.
9. Check for continuity between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, connector C (2P) No. 2 terminal individually.

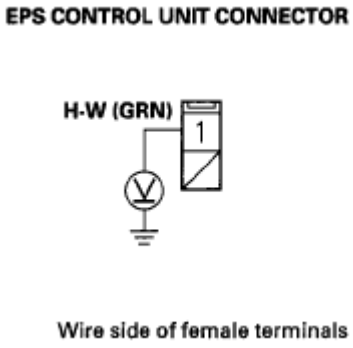



**Fig. 24: Checking Continuity Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

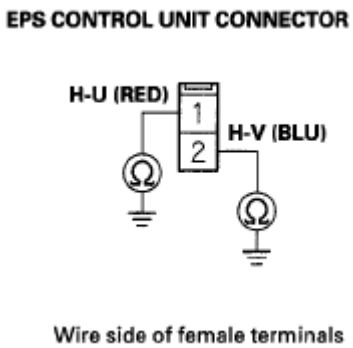



**Fig. 25: Checking Continuity Connector C (2P) No. 1 Terminal Connector C (2P) No. 2 Terminal**

*Is there continuity?*

**YES** -Repair short to body ground in the wire between the EPS control unit and motor.

**NO** -Short in the motor wire harness, or motor internal circuit, replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**DTC 33-02: UPPER FET STUCK ON (INITIAL DIAGNOSIS); DTC 33-07: UPPER FET STUCK ON (REGULAR DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.

   *Does the EPS indicator come on?*

   **YES** -Go to step 4.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Check for DTCs with the HDS.

   *Is DTC 33-02 or DTC 33-07 indicated?*

   **YES** -Go to step 5.

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control unit connector B (2P) and connector C (2P).
7. Turn the ignition switch ON (II).
8. Measure voltage between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, and connector C (2P) Non terminal individually.

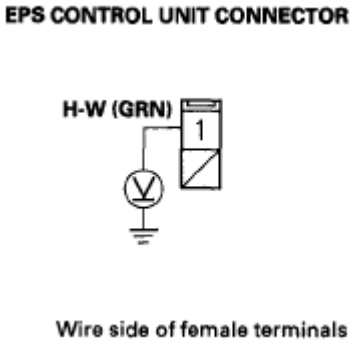



**Fig. 26: Measuring Voltage Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

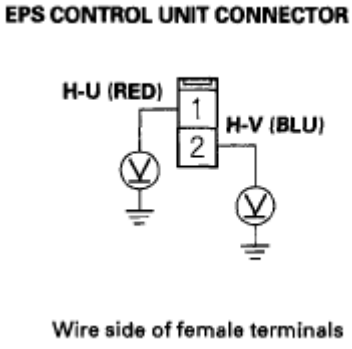



**Fig. 27: Measuring Voltage Between Connector C (2P) No. 1 Terminal And Connector C (2P) Non Terminal**

*Is there battery voltage?*

**YES** -Go to step 9.

**NO** -Check for loose terminals in the EPS control unit connectors and motor connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

9. Turn the ignition switch to LOCK (0).
10. Disconnect the motor 1P connector and motor 2P connector.
11. Turn the ignition switch ON (II).
12. Measure voltage between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, and connector C (2P) No. 2

terminal individually.

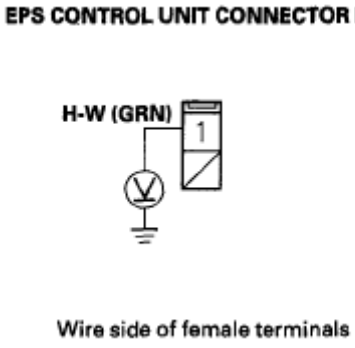



**Fig. 28: Measuring Voltage Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

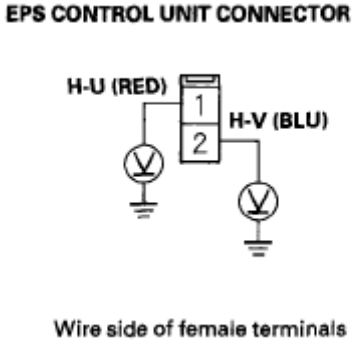



**Fig. 29: Measuring Voltage Between Connector C (2P) No. 1 Terminal And Connector C (2P) No. 2 Terminal**

*Is there battery voltage?*

**YES** - Repair short to power in the wire between the EPS control unit and motor.

**NO** - Short to power in the motor wire harness, or motor internal circuit, replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**DTC 34-01: POWER RELAY STUCK ON (IGNITION SWITCH IS OFF)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Turn the ignition switch ON (II).

*Does the EPS indicator come on?*

**YES** - Go to step 4.

**NO** - Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Check for DTCs with the HDS.

   *Is DTC 34-01 indicated?*

   **YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

**DTC 34-02: FAIL-SAFE RELAY STUCK ON (INITIAL DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Turn the ignition switch ON (II).

   *Does the EPS indicator come on?*

   **YES** -Go to step 4.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Check for DTCs with the HDS.

   *Is DTC 34-02 indicated?*

   **YES** -Go to step 5.

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK

at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control unit connector B (2P) and connector C (2P).
7. Turn the ignition switch ON (II).
8. Measure voltage between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, and connector C (2P) No. 2 terminal individually.

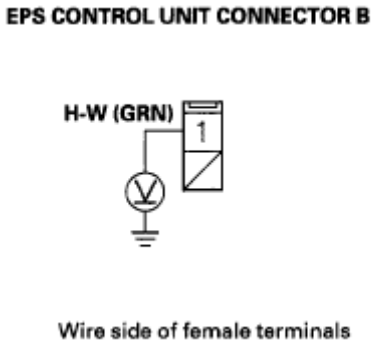



**Fig. 30: Measuring Voltage Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

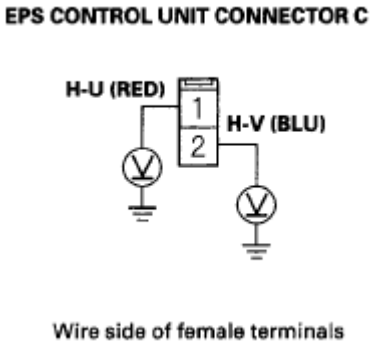



**Fig. 31: Measuring Voltage Between Connector C (2P) No. 1 Terminal And Connector C (2P) No. 2 Terminal**

*Is there battery voltage?*

**YES** -Repair short to power in the wire between the EPS control unit and the motor.

**NO** -Replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**DTC 35-03: EPS CONTROL UNIT INTERNAL CIRCUIT (EPS CPU) (INITIAL DIAGNOSIS); DTC 35-05: EPS CONTROL UNIT INTERNAL CIRCUIT (MOTOR/EPS CPU) (INITIAL DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Turn the ignition switch ON (II).

   *Does the EPS indicator come on?*

   **YES** -Go to step 4.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Start the engine.
5. Wait 10 seconds or more.
6. Check for DTCs with the HDS.

   *Is DTC 35-03 or DTC 35-05 indicated?*

   **YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

**DTC 51-01: LOW/HIGH VOLTAGE FOR THE TORQUE SENSOR (VT1 AND VT2) (REGULAR DIAGNOSIS)**

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the data link connector (DLC).
3. Turn the ignition switch ON (II).
4. Check the ADVT1 in the DATA LIST with the HDS.

*Is the voltage at 0.90-3.55 V?*

**YES** -Go to step 5.

**NO** -Go to step 6.

5. Check the ADVT2 in the DATA LIST with the HDS.

   *Is the voltage at 1.02-3.73 V?*

   **YES** -Check for loose wires or poor connections. If the connections are good, the system is OK at this time.

   **NO** -Go to step 6.

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector D (28P).
8. Measure resistance between EPS control unit connector D (28P) terminals No. 9 and No. 10.

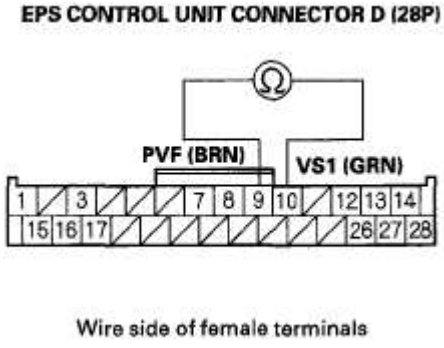



**Fig. 32: Measuring Resistance Between EPS Control Unit Connector D (28P) Terminals No. 9 And No. 10**

*Is the resistance between 12-15 ohms?*

**YES** -Go to step 9.

**NO** -Go to step 13.

9. Measure resistance between EPS control unit connector D (28P) terminals No.

8 and No. 9.

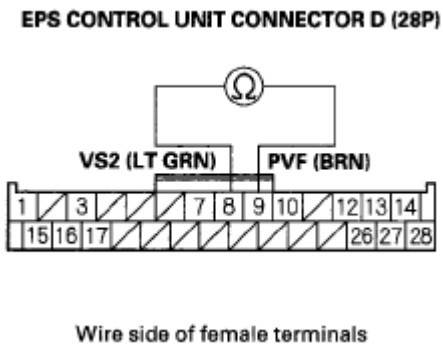



**Fig. 33: Measuring Resistance Between EPS Control Unit Connector D (28P) Terminals No. 8 And No. 9**

*Is the resistance between 12-15 ohms?*

**YES** -Go to step 10.

**NO** -Go to step 15.

10. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

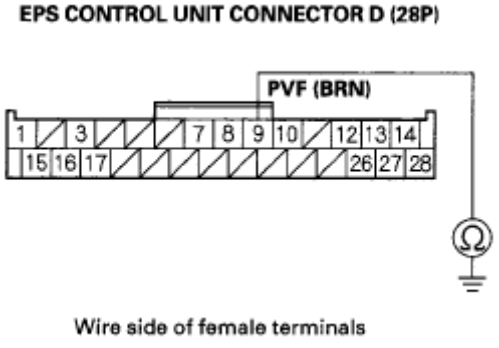



**Fig. 34: Checking Continuity Between EPS Control Unit Connector D (28P) Terminal No. 9 And Body Ground**

*Is there continuity?*

**YES** -Go to step 11.

**NO** -Check for loose terminals in the EPS control unit connectors, and repair if

necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

11. Disconnect the torque sensor 3P connector from the steering gearbox.
12. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

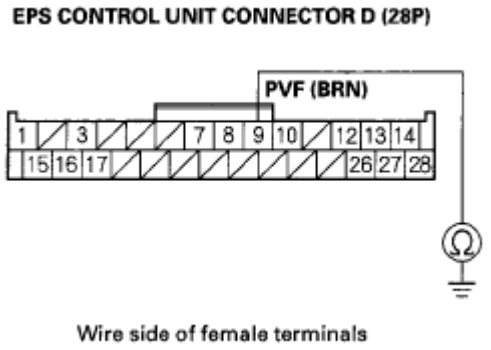



**Fig. 35: Checking Continuity Between EPS Control Unit Connector D (28P) Terminal No. 9 And Body Ground**

*Is there continuity?*

**YES** -Repair short to ground in the wire between the torque sensor and the EPS control unit.

**NO** -Faulty torque sensor (short in the sensor internal circuit), replace the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).

13. Disconnect the torque sensor 3P connector from the steering gearbox.
14. On the sensor side, measure the resistance between torque sensor terminals No. 1 and No. 2.

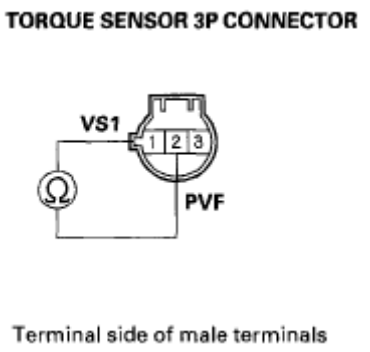



**Fig. 36: Measuring Resistance Between Torque Sensor Terminals No. 1 And No. 2**

*Is the resistance between 12-15 ohms?*

**YES** -Repair open or short between the PNK and BLU/RED wires in the torque sensor circuit between the torque sensor and the EPS control unit.

**NO** -Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).

15. Disconnect the torque sensor 3P connector from the steering gearbox.
16. On the sensor side, measure the resistance between torque sensor terminals No. 2 and No. 3.

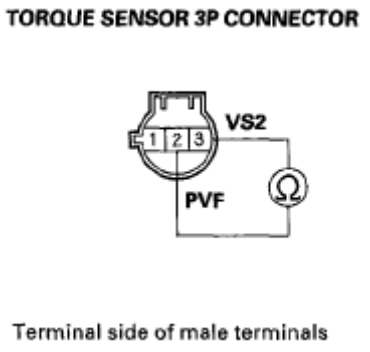



**Fig. 37: Measuring Resistance Between Torque Sensor Terminals No. 2 And No. 3**

*Is the resistance between 12-15 ohms?*

**YES** -Repair open or short between the WHT/GRN and BLU/RED wires in the torque sensor circuit between the torque sensor and the EPS control unit.

**NO** -Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).

**DTC 51-02: TORQUE SENSOR (VT3 DIFFERENTIAL-AMPLIFICATION FUNCTION) (REGULAR DIAGNOSIS); DTC 51-03: TORQUE SENSOR (VT1, VT2 RAPID-CHANGE) (REGULAR DIAGNOSIS); DTC 51-06: TORQUE SENSOR (VT1, VT2 AVERAGE) (REGULAR DIAGNOSIS); DTC 51-07: TORQUE SENSOR (VT1, VT2 INITIAL CHECK) (INITIAL DIAGNOSIS)**

1. Clear the DTC with the HDS
2. Turn the ignition switch to LOCK (0).
3. Start the engine.

   *Does the EPS indicator come on?*

   **YES** -Go to step 4.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

4. Check for DTCs with the HDS.

   *Is DTC 51-02, 51-03, 51-06 or 51-07 indicated?*

   **YES** -Go to step 5.

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

5. Turn the ignition switch to LOCK (0).
6. Disconnect EPS control unit connector D (28P).
7. Measure the resistance between EPS control unit connector D (28P) terminals No. 9 and No. 10.

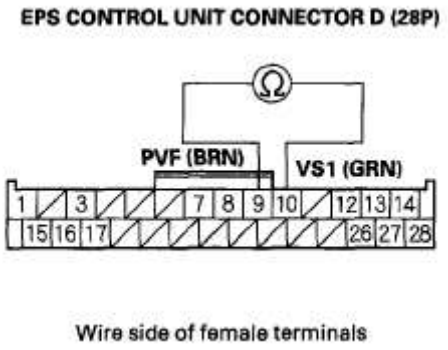



**Fig. 38: Measuring Resistance Between EPS Control Unit Connector D (28P) Terminals No. 9 And No. 10**

*Is the resistance between 12-15 ohms?*

**YES** -Go to step 8.

**NO** -Go to step 12.

8. Measure resistance between EPS control unit connector D (28P) terminals No. 8 and No. 9.

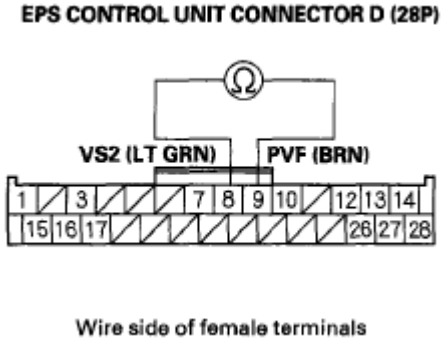



**Fig. 39: Measuring Resistance Between EPS Control Unit Connector D (28P) Terminals No. 8 And No. 9**

*Is the resistance between 12-15 ohms?*

**YES** -Go to step 9.

**NO** -Go to step 14.

9. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

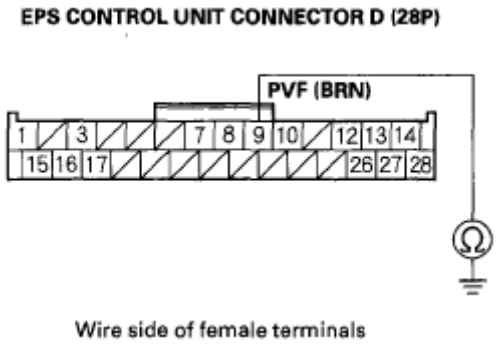



**Fig. 40: Checking Continuity Between EPS Control Unit Connector D (28P) Terminal No. 9 And Body Ground**

*Is there continuity?*

**YES** -Go to step 10.

**NO** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

10. Disconnect the torque sensor 3P connector from the steering gearbox.
11. Check for continuity between EPS control unit connector D (28P) terminal No. 9 and body ground.

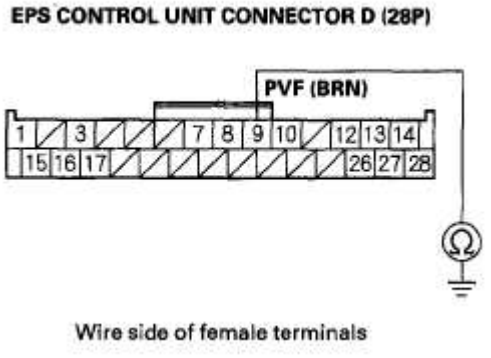



**Fig. 41: Checking Continuity Between EPS Control Unit Connector D (28P) Terminal No. 9 And Body Ground**

*Is there continuity?*

**YES** -Repair short to body ground in the wire between the torque sensor and the EPS control unit.

**NO** -Faulty torque sensor (short in the sensor internal circuit), replace the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).

12. Disconnect the torque sensor 3P connector from the steering gearbox.
13. On the sensor side, measure the resistance between torque sensor terminals No. 1 and No. 2.

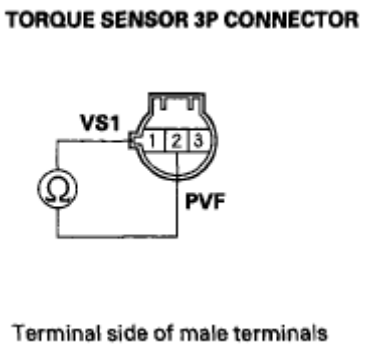



**Fig. 42: Measuring Resistance Between Torque Sensor Terminals No. 1 And No. 2**

*Is the resistance between 12-15 ohms?*

**YES** -Repair open or short between the PNK and BLU/RED wires in the torque sensor circuit between the torque sensor and the EPS control unit.

**NO** -Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).

14. Disconnect the torque sensor 3P connector from the steering gearbox.
15. On the sensor side, measure the resistance between torque sensor terminals No. 2 and No. 3.

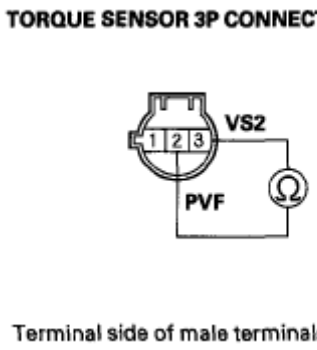



**Fig. 43: Measuring Resistance Between Torque Sensor Terminals No. 2 And No. 3**

*Is the resistance between 12-15 ohms?*

**YES** -Repair open or short between the BLU/RED and WHT/GRN wires in the torque sensor circuit between the torque sensor and the EPS control unit.

**NO** -Faulty torque sensor (short or open in the internal circuit), replace the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).

**DTC 61-04: OPEN/SHORT IN THE MOTOR HARNESS (STEERING DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Turn the steering wheel to the right or left, and wait 10 seconds or more.

   *Does the EPS indicator come on?*

   **YES** -Go to step 5.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

5. Check for DTCs with the HDS.

   *Is DTC 61-04 indicated?*

**YES** -Go to step 6.

**NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector B (2P) and connector C(2P).
8. Check for continuity between the following terminals of the EPS control unit connector B (2P) and connector C(2P).

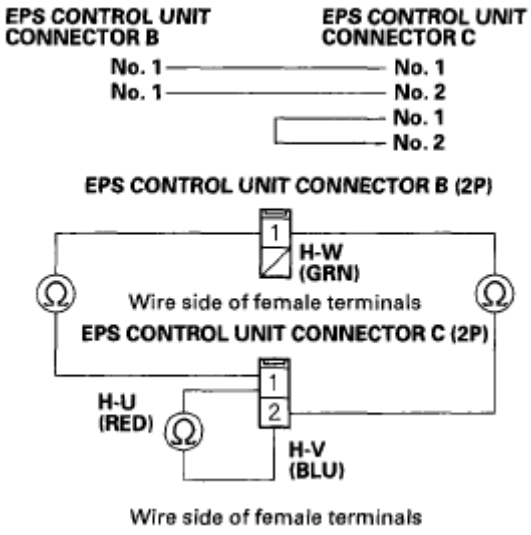



**Fig. 44: Checking Continuity Between Following Terminals Of EPS Control Unit Connector B (2P) And Connector C(2P)**

*Is there continuity?*

**YES** -Go to step 9.

**NO** -Go to step 12.

9. Check for continuity between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, and connector C (2P) No. 2 terminal individually.

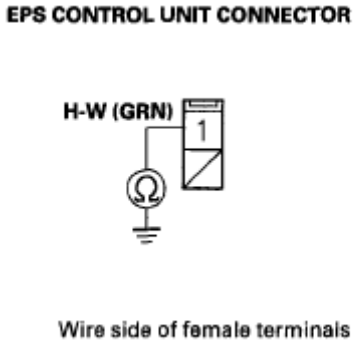



**Fig. 45: Checking Continuity Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

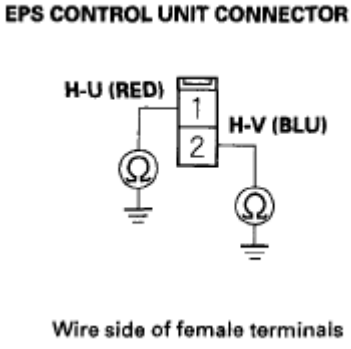



**Fig. 46: Checking Continuity Connector C (2P) No. 1 Terminal And Connector C (2P) No. 2 Terminal**

*Is there continuity?*

**YES** -Go to step 10.

**NO** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

10. Disconnect the motor 1P connector and the motor 2P connector.
11. Check for continuity between body ground and EPS control unit connector B (2P) No. 1 terminal, connector C (2P) No. 1 terminal, and connector C (2P) No. 2 terminal individually.

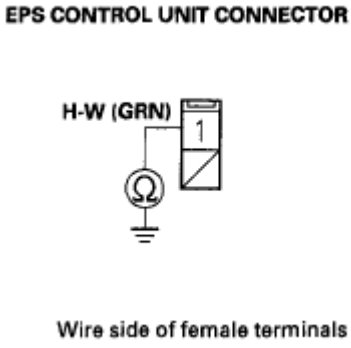



**Fig. 47: Checking Continuity Between Body Ground And EPS Control Unit Connector B (2P) No. 1 Terminal**

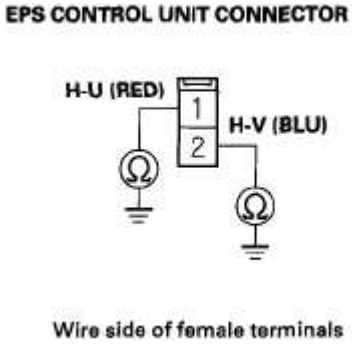



**Fig. 48: Checking Continuity Connector C (2P) No. 1 Terminal And Connector C (2P) No. 2 Terminal**

*Is there continuity?*

**YES** -Repair short to body ground in the wire harness between the EPS control unit and the motor.

**NO** -Short to the body ground in the motor wire harness, or motor internal circuit, replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

12. Disconnect the motor 1P connector and the motor 2P connector.
13. On the motorside, check for continuity between the following terminals of the motor 1P and the motor 2P connector.

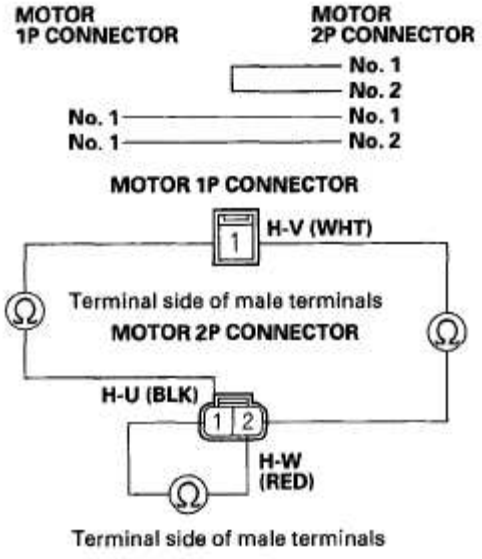



**Fig. 49: Checking Continuity Between Terminals Of Motor 1P And Motor 2P Connector**

*Is there continuity?*

**YES** -Repair open in the wire harness between the EPS control unit and the motor.

**NO** -Open in the motor wire harness, or motor internal circuit, replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**DTC 71-01: MOTOR ANGLE SENSOR (SIN/COS SIGNALS) (STEERING DIAGNOSIS); DTC 71-02: MOTOR ANGLE SENSOR (NEUTRAL POSITION LEARNING OF SIN/COS) (INITIAL DIAGNOSIS); DTC 71-03: MOTOR ANGLE SENSOR (SIN/COS SIGNALS) (STEERING DIAGNOSIS); DTC 71-05: MOTOR ANGLE SENSOR (SIN/COS SIGNALS CHANGING AMOUNT) (STEERING DIAGNOSIS); DTC 71-06: MOTOR ANGLE SENSOR (NEUTRAL POSITION OF SIN/COS) (INITIAL DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Turn the steering wheel to the right or left, and wait 10 seconds or more.

*Does the EPS indicator come on?*

**YES** -Go to step 5.

**NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

5. Check for DTCs with the HDS.

   *Is DTC 71-01, 71-02, 71-03, 71-05 or 71-06 indicated?*

   **YES** -Go to step 6.

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector D (28P).
8. Measure the resistance between the following terminals of EPS control unit connector D (28P).

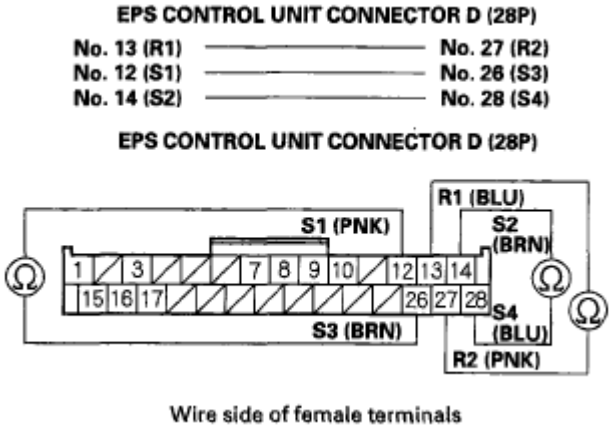



**Fig. 50: Measuring Resistance Between Following Terminals Of EPS Control Unit Connector D (28P)**

*Is the resistance between R1-R2 13-25 ohms, S1-S3 26-49 ohms, and S2-S4 26-49 ohms?*

**YES** -Go to step 9.

**NO** -Go to step 12.

9. Check for continuity between body ground and EPS control unit connector D (28P) No. 12 terminal, No. 13 terminal, No. 14 terminal, No. 26 terminal, No. 27 terminal, and No. 28 terminal individually.

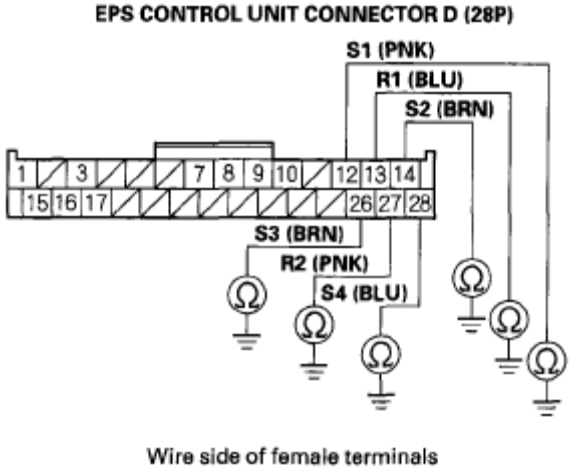



**Fig. 51: Checking Continuity Between Body Ground And EPS Control Unit Connector D (28P) No. 12 Terminal, No. 13 Terminal**

*Is there continuity?*

**YES** -Go to step 10.

**NO** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

10. Disconnect the motor angle sensor 6P connector.
11. Check for continuity between body ground and motor angle sensor 6P connector No. 1 terminal, No. 2 terminal, No. 3 terminal, No. 4 terminal, No. 5 terminal, and No. 6 terminal individually.

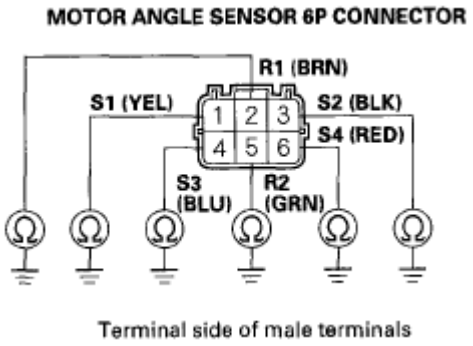



**Fig. 52: Checking Continuity Between Body Ground And Motor Angle Sensor 6P Connector No. 1 Terminal, No. 2 Terminal, No. 3 Terminal**

*Is there continuity?*

**YES** -Faulty motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**NO** -Repair short to body ground in the wire between the motor angle sensor 6P connector and the EPS control unit.

12. Disconnect the motor angle sensor 6P connector.
13. Measure resistance between the following terminals of the motor angle sensor 6P connector.

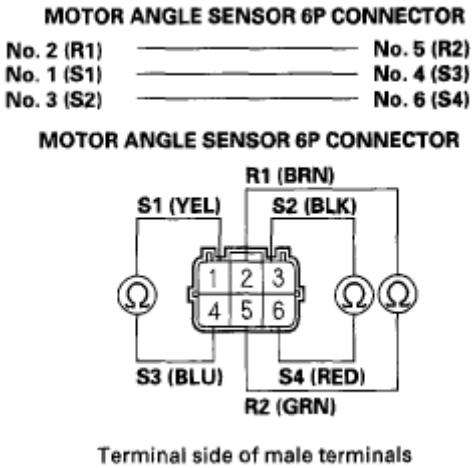



**Fig. 53: Measuring Resistance Between Following Terminals Of Motor Angle Sensor 6P Connector**

*Is the resistance between R1-R2 13-25 ohms, S1-S3 26-49 ohms, and S2-S4 26-49 ohms?*

**YES** -Open, or short to body ground in the wire between the motor angle sensor 6P connector and the EPS control unit.

**NO** -Faulty motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**DTC 71-04: MOTOR ANGLE SENSOR (CHECK SIGNALS) (REGULAR DIAGNOSIS)**

1. Clear the DTC with the HDS.
2. Turn the ignition switch to LOCK (0).
3. Start the engine.
4. Turn the steering wheel to the right or left, and wait 10 seconds or more.

   *Does the EPS indicator come on?*

   **YES** -Go to step 5.

   **NO** -Check for loose terminals or poor connections. If the connections are good, the system is OK at this time.

5. Check for DTCs with the HDS.

   *Is DTC 71-04 indicated?*

   **YES** -Go to step 6.

   **NO** -Troubleshoot the indicated DTC. If there are no DTCs, the system is OK at this time.

6. Turn the ignition switch to LOCK (0).
7. Disconnect EPS control unit connector D (28P).
8. Measure the resistance between the EPS control unit connector D (28P) terminal No. 13 and No. 27.

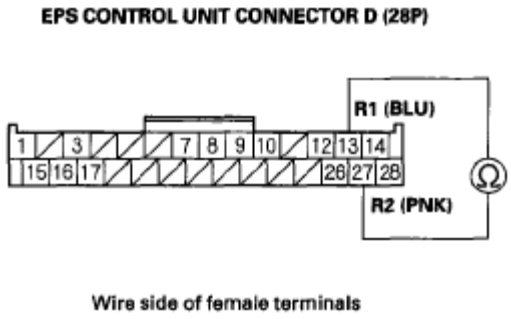



**Fig. 54: Measuring Resistance Between EPS Control Unit Connector D (28P) Terminal No. 13 And No. 27**

*Is the resistance between 13-25 ohms?*

**YES** -Go to step 9.

**NO** -Go to step 12.

9. Check for continuity between body ground and the EPS control unit connector D (28P) No. 13 terminal and the No. 27 terminal individually.

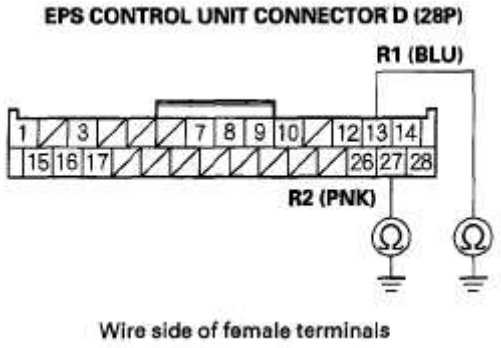



**Fig. 55: Checking Continuity Between Body Ground And EPS Control Unit Connector D (28P) No. 13 Terminal And No. 27 Terminal**

*Is there continuity?*

**YES** -Go to step 10.

**NO** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

10. Disconnect the motor angle sensor 6P connector.
11. Check for continuity between body ground and motor angle sensor 6P connector No. 2 terminal and the No. 5 terminal individually.

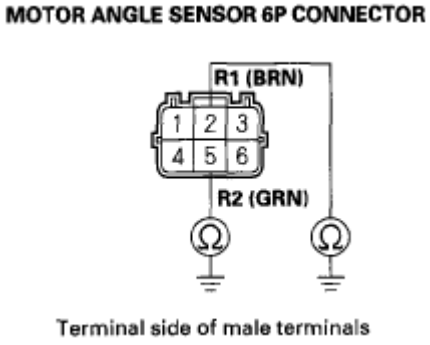



**Fig. 56: Checking Continuity Between Body Ground And Motor Angle Sensor 6P Connector No. 2 Terminal**

*Is there continuity?*

**YES** -Faulty motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

**NO** -Repair short to body ground in the wire harness between the motor angle sensor 6P connector and the EPS control unit.

12. Disconnect the motor angle sensor 6P connector.
13. Measure the resistance between the motor angle sensor 6P connector terminals No. 2 and No. 5.

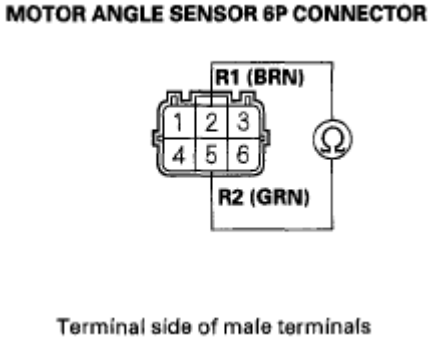


**Fig. 57: Measuring Resistance Between Motor Angle Sensor 6P Connector Terminals No. 2 And No. 5**

*Is the resistance between 13-25 ohms?*

**YES** -Open, or short to body ground in the wire harness between the motor angle sensor 6P connector and EPS control unit.

**NO** -Faulty motor angle sensor (internal failure), or short to body ground in the wire (sensor side), replace the motor (see **MOTOR REMOVAL AND INSTALLATION** ).

## SYMPTOM TROUBLESHOOTING

### EPS INDICATOR DOES NOT COME ON

1. Turn the ignition switch ON (II), and watch the EPS indicator.

   *Does the EPS indicator come on?*

   **YES** -The system is OK at this time.

   **NO** -Troubleshoot the gauge control module (tach) (see **SELF-DIAGNOSTIC FUNCTION** ).

### EPS INDICATOR DOES NOT GO OFF, AND NO DTCS ARE STORED

1. Turn the ignition switch to LOCK (0).
2. Connect the HDS to the data link connector (DLC).
3. Turn the ignition switch ON (II).
4. Check for DTCs with the HDS.

   *Are any DTCs indicated?*

   **YES** -Troubleshooting the indicated DTC.

   **NO** -Go to step 5.

5. Turn the ignition switch to LOCK (0).
6. Check the No. 4 (7.5 A) fuse in the under-dash fuse/relay box.

   *Is the fuse OK?*

   **YES** -Reinstall the fuse, and go to step 7.

   **NO** -Replace the fuse, and recheck. If the fuse is blown, check for a short to body ground in this fuse circuit.

7. Disconnect EPS control unit connector D (28P).
8. Turn the ignition switch ON (II).
9. Measure voltage between EPS control unit connector D (28P) terminal No. 16 and body ground.

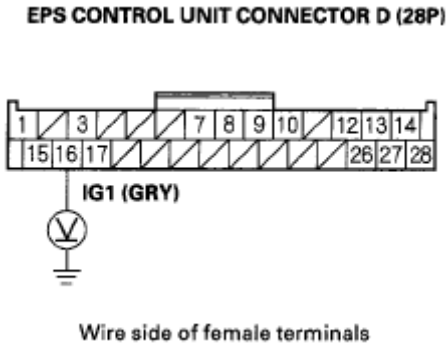



**Fig. 58: Measuring Voltage Between EPS Control Unit Connector D (28P) Terminal No. 16 And Body Ground**

   *Is the voltage between 9.20-17.4 V?*

   **YES** -Go to step 10.

   **NO** -Repair open in the wire between the EPS control unit and under-dash fuse/relay box.

10. Turn the ignition switch to LOCK (0).
11. Disconnect EPS control unit connector A (2P).
12. Check for continuity between EPS control unit connector A (2P) terminal No.

1 and body ground.

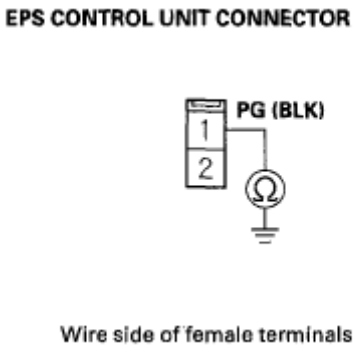



**Fig. 59: Checking Continuity Between EPS Control Unit Connector A (2P) Terminal No. 1 And Body Ground**

*Is there continuity?*

**YES** -Go to step 13.

**NO** -Repair open in the wire between the EPS control unit and body ground (G402).

13. Disconnect the gauge control module (tach) 36P connector and EPS control unit connector D (28P).
14. Check for continuity between EPS control unit connector D (28P) terminal No. 1 and gauge control module (tach) 36P connector terminal No. 1.

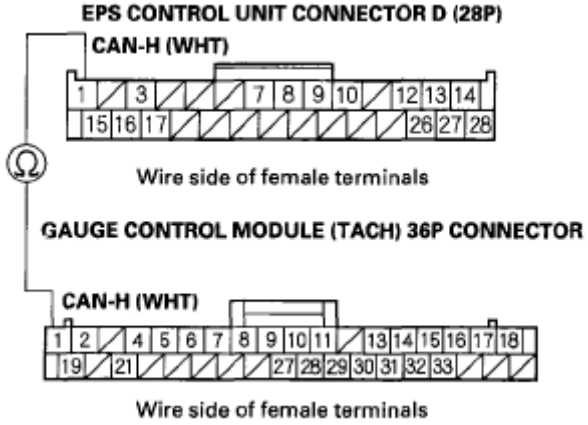

EPS CONTROL UNIT CONNECTOR D (28P)
CAN-H (WHT)
1 3 7 8 9 10 12 13 14
15 16 17 26 27 28
Wire side of female terminals
GAUGE CONTROL MODULE (TACH) 36P CONNECTOR
CAN-H (WHT)
1 2 4 5 6 7 8 9 10 11 13 14 15 16 17 18
19 21 27 28 29 30 31 32 33
Wire side of female terminals

**Fig. 60: Checking Continuity Between EPS Control Unit Connector D (28P) Terminal No. 1 And Gauge Control Module**

*Is there continuity?*

**YES** -Go to step 15.

**NO** -Repair open in the wire between the EPS control unit and the gauge control module (tach).

15. Check for continuity between EPS control unit connector D (28P) terminal No. 15 and gauge control module (tach) 36P connector terminal No. 19.

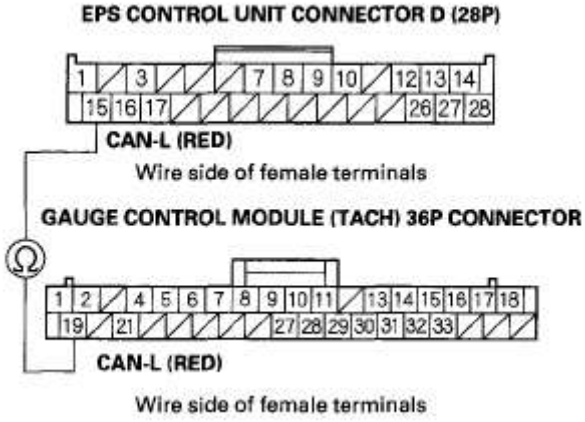

EPS CONTROL UNIT CONNECTOR D (28P)
1 3 7 8 9 10 12 13 14
15 16 17 26 27 28
CAN-L (RED)
Wire side of female terminals
GAUGE CONTROL MODULE (TACH) 36P CONNECTOR
1 2 4 5 6 7 8 9 10 11 13 14 15 16 17 18
19 21 27 28 29 30 31 32 33
CAN-L (RED)
Wire side of female terminals

**Fig. 61: Check For Continuity Between EPS Control Unit Connector D (28P) Terminal No. 15**

*Is there continuity?*

**YES** -Check for loose terminals in the EPS control unit connectors, and repair if necessary. If no poor connections are found, replace the EPS control unit (see **EPS CONTROL UNIT REMOVAL/INSTALLATION** ).

**NO** -Repair open in the wire between the EPS control unit and the gauge control module (tach).

## MOTOR REMOVAL AND INSTALLATION

### REMOVAL

**NOTE: Do not allow dust, dirt, or other foreign materials to enter the steering gearbox.**

1. Remove the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).
2. Disconnect the torque sensor 3P connector (A) from the steering gearbox, then remove the harness clamp bolts and the ground terminal (B).

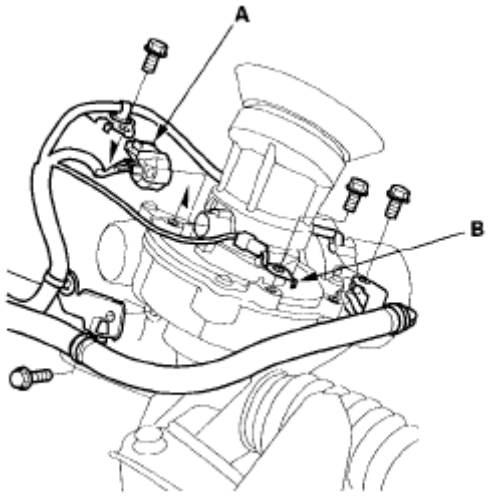



**Fig. 62: Identifying Steering Gearbox And Harness Clamp Bolts**

3. Remove the motor (A) from the steering gearbox, then remove the O-ring (B) and discard it.

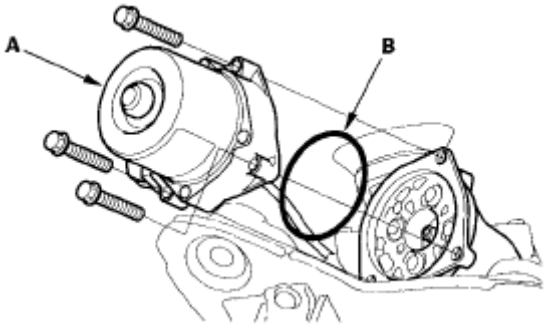



**Fig. 63: Identifying Motor (A) From Steering Gearbox And O-Ring**

**INSTALLATION**

1. Clean the mating surface of the motor (A) and the steering gearbox.

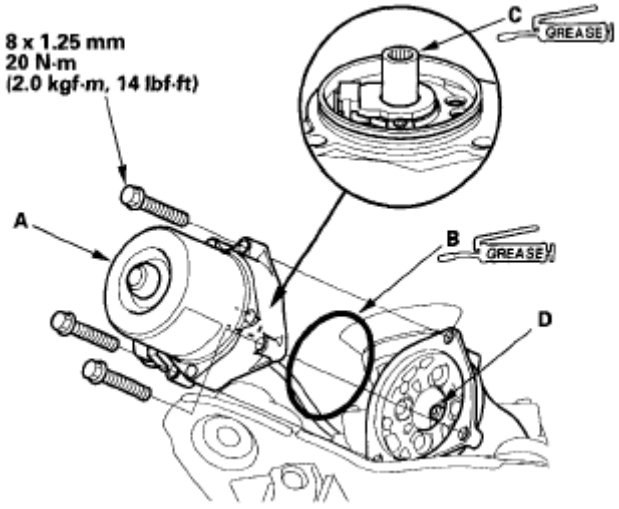



**Fig. 64: Identifying Mating Surface Of Motor (A) And Steering Gearbox**

2. Apply a thin coat of silicone grease to the new O-ring (B), and carefully fit it on the motor.
3. Apply grease (Shell steering gear grease or Honda's equivalent steering gear grease) into the motor shaft (C).
4. Install the motor on the steering gearbox by engaging the motor shaft and the worm shaft (D).
5. Before tightening the bolts, turn the motor two or three times to the right and left about 45 degrees. Make sure the motor is evenly seated on the steering gearbox, and that the O-ring is not pinched between the mating surfaces.
6. Connect the torque sensor 3P connector (A) to the steering gearbox, then install the harness clamp bolts and the ground terminal (B).

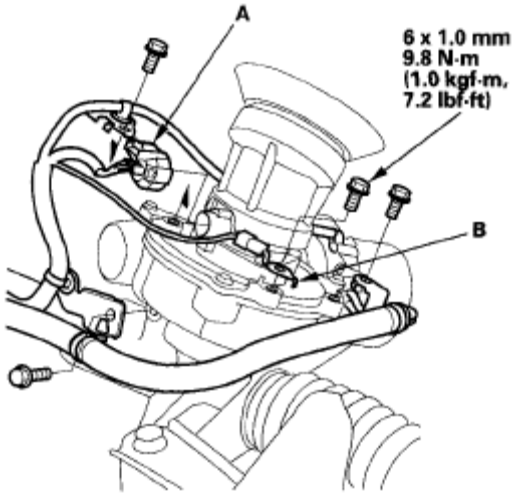



**Fig. 65: Identifying Steering Gearbox Harness Clamp Bolts (With Torque Specifications)**

7. Finish the installation, and note these items:
   - Make sure the torque sensor 3P connector is properly connected.
   - Make sure the motor and the EPS wires are not caught or pinched by any parts.
8. Install the steering gearbox (see **INSTALLATION** ).

## STEERING GEARBOX REMOVAL AND INSTALLATION

### Special Tools Required

- Ball joint remover, 28 mm 07MAC-SL0A202
- Engine hanger/adaptor VSB02C000015 *
- Front subframe adaptor VSB02C000016 *
- 2006 Civic engine hanger VSB02C000025 *
- Engine support hanger, A and Reds AAR-T-12566 *

* Available through the American Honda Tool and Equipment program, 1-888-424-6857.

#### REMOVAL

Note these items during removal:

- Use solvent and a brush to wash any oil and dirt off the end of the steering gearbox. Avoid any electrical parts. Blow dry with compressed air.
- Make sure to remove the steering wheel before disconnecting the steering joint to avoid damaging the cable reel.

1. Make sure you have the anti-theft code for the audio or navigation system, then write down the audio presets.
2. Make sure the ignition switch is OFF, then disconnect the negative cable from the battery.
3. Raise the front of the vehicle, and support it with safety stands in the proper locations (see **LIFT AND SUPPORT POINTS** ).
4. Remove the front wheels.
5. Remove the steering wheel (see **STEERING WHEEL REMOVAL** ).
6. Remove the driver's dashboard under cover (see **DRIVER's DASHBOARD UNDERCOVER REMOVAL/INSTALLATION** ).
7. Remove the steering joint cover (A).

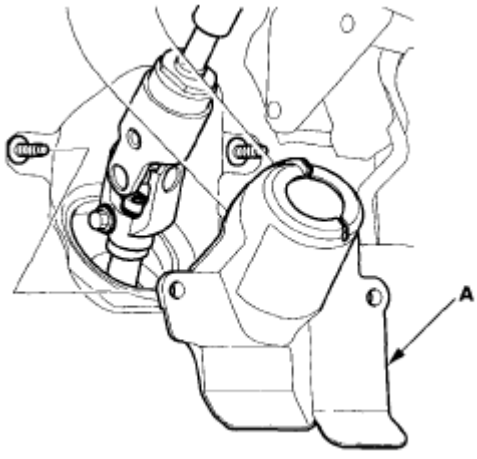



**Fig. 66: Identifying Steering Joint Cover (A)**

8. Hold the lower slide shaft (A) on the column with a piece of wire (B) between the joint yoke (C) of the lower slide shaft and joint yoke (D) of the upper shaft to prevent the slider shaft from pulling out.

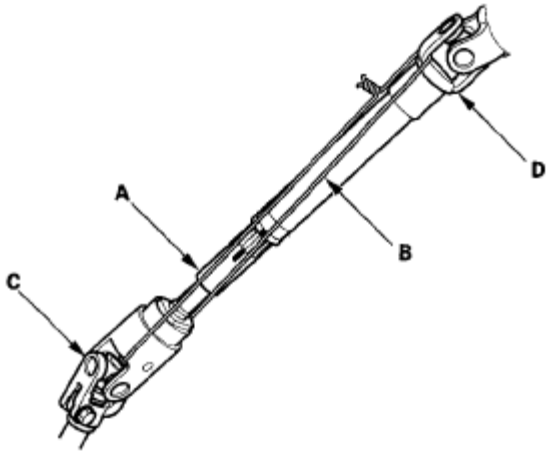



**Fig. 67: Identifying Lower Slide Shaft With Wire Between Joint Yokes**

9. Release the lock lever, and adjust the steering column to the full telescopic out position, then tighten the lock lever.
10. Remove the steering joint bolt (A), and disconnect the steering joint by moving the steering joint (B) toward the column..

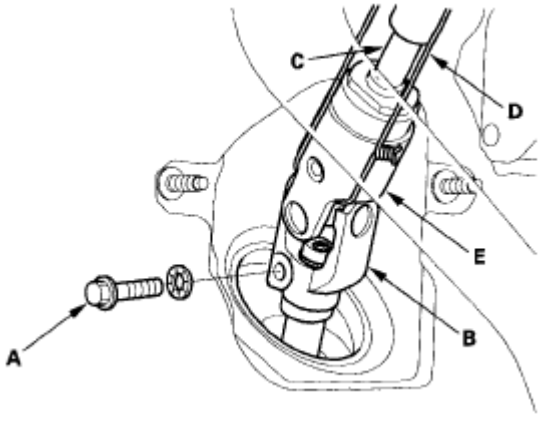



**Fig. 68: Identifying Steering Joint Moving Steering Joint Toward Column**

11. Remove the center guide (A) (if equipped), and discard it. The center guide is for factory assembly only.

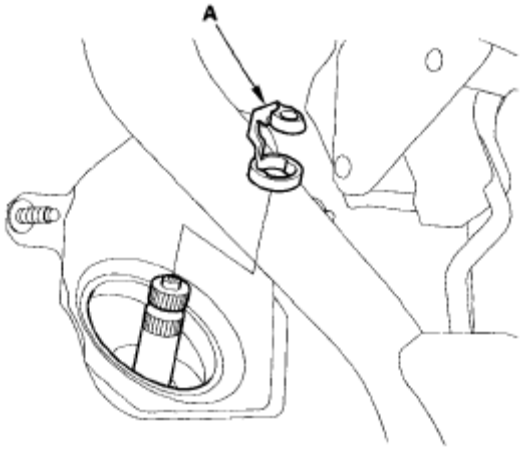



**Fig. 69: Identifying Center Guide**

12. Remove the under cowl panel (see **FRONT GRILLE COVER REPLACEMENT** ).
13. Remove the air cleaner housing.
    - For R18A1 engine (see **THROTTLE BODY CLEANING** )
    - For K20Z3 engine (see **AIR CLEANER REMOVAL/INSTALLATION** )
14. Attach the engine hanger adapter to the threaded hole in the cylinder head.

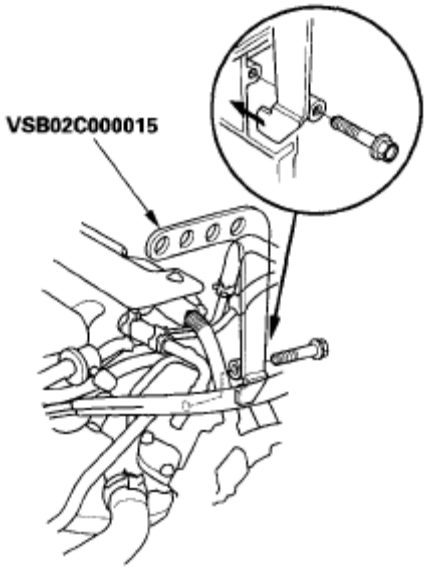



**Fig. 70: Identifying Cylinder Head**

15. Install the front leg assembly (A), hook (B), and wing nut (C) from an A and Reds engine support hanger (AAR-T-12566) onto the engine hanger. Carefully position the engine hanger on the vehicle, and attach the hook to the forward hole in the engine hanger/adapter (D). Tighten the wing nut by hand to lift and support the engine/transmission assembly.

**NOTE: Be careful when working around the windshield.**

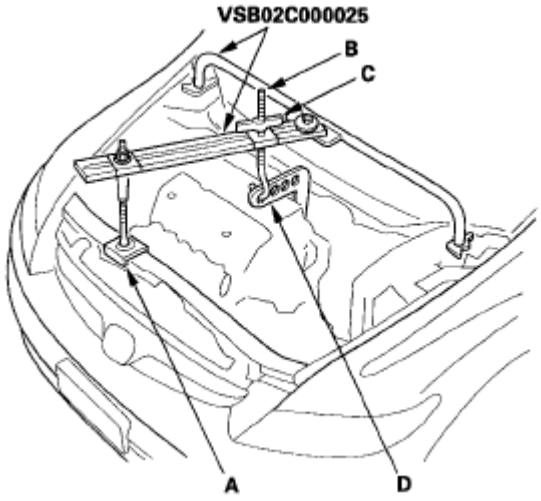



**Fig. 71: Identifying Front Leg Assembly (A)**

16. Remove the cotter pin (A) from the 12 mm nut (B), and loosen the nut.

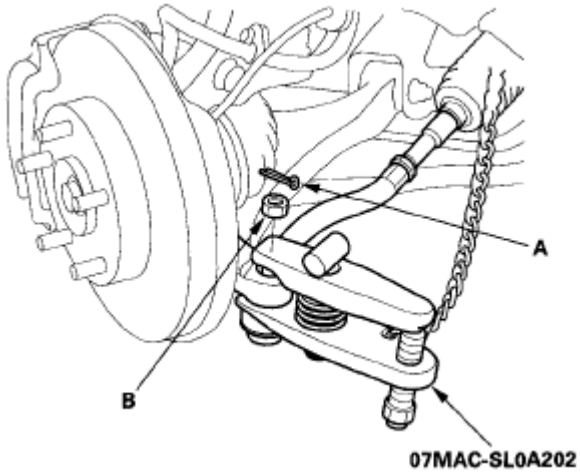



**Fig. 72: Identifying Cotter Pin (A)**

17. Separate the tie-rod ball joint and the knuckle using the ball joint remover (see **BALL JOINT REMOVAL** ).
18. Remove the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT** ).
19. Disconnect the torque sensor 4P connector (A), motor angle sensor 6P connector (B), motor IP connector (C), and motor 2P connector (D) from the right side of the steering gearbox. Wrap the connectors with vinyl tape to avoid contamination from grease or water.

**Fig. 73: Identifying Motor Angle Sensor 6P Connector (B)**

20. Remove the lower ball joint mounting bolt (A) and the flange nuts (B) from the lower arm.

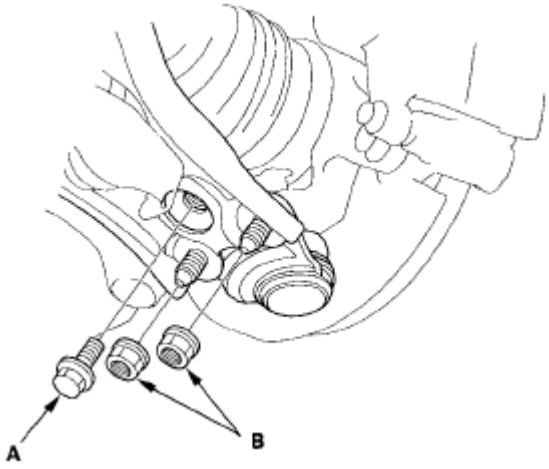


**Fig. 74: Identifying Lower Ball Joint Mounting Bolt**

21. Disconnect the lower arm from the lower ball housing.
22. Remove the exhaust hanger (A) from the three way catalytic converter (TWC) (B).

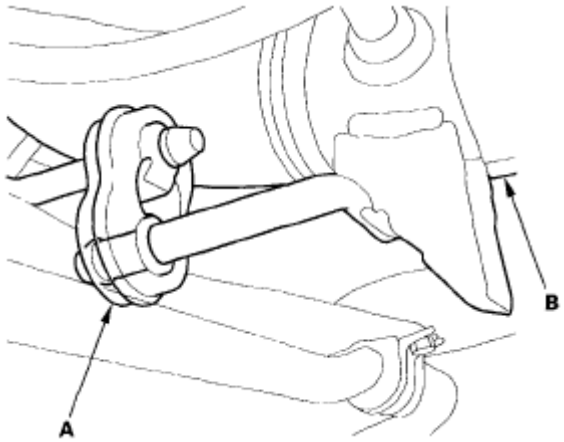



**Fig. 75: Identifying Exhaust Hanger (A) From Three Way Catalytic Converter (TWC)**

23. Note the reference marks (A) on both sides of the subframe that line up with the body (B).

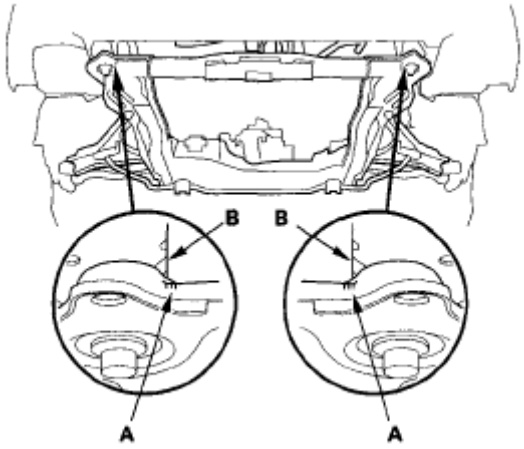



**Fig. 76: Identifying Subframe Line Up With Body (B)**

24. Attach the front subframe adaptor (A) to the front subframe (B) and the transmission jack (model number LSL-W9371) or the powertrain lift (model

number OTC-1585), then tighten the front subframe adaptor screw.

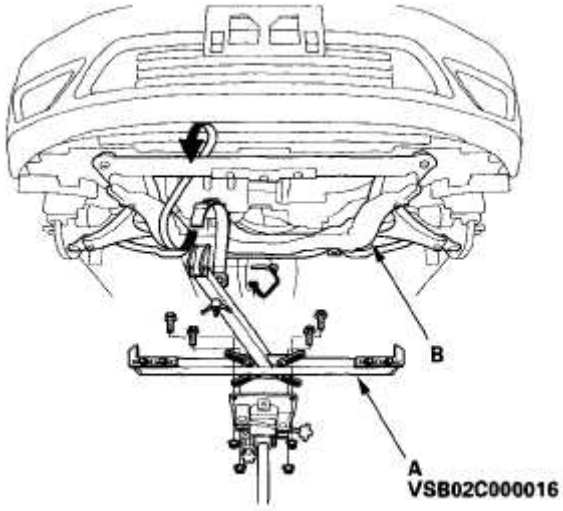



**Fig. 77: Identifying Front Subframe Adaptor To Front Subframe**

25. Make sure the front subframe is securely supported by the jack with the front subframe adaptor.
26. Remove the front subframe middle mount bolt (A) from the left side.

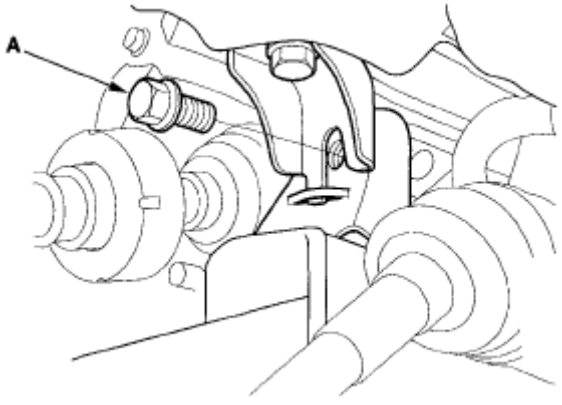



**Fig. 78: Identifying Front Subframe Middle Mount Bolt (A) From Left Side**

27. Remove the front subframe middle mount bolt (A) from the right side.

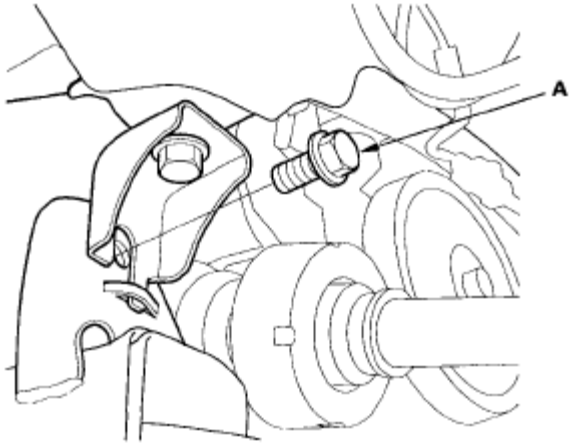



**Fig. 79: Identifying Front Subframe Middle Mount Bolt (A) From Right Side**

28. Remove the lower torque rod mounting bolt (A) and discard it.

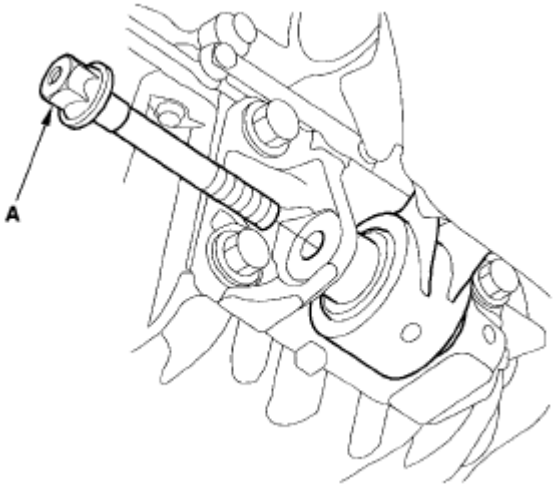



**Fig. 80: Identifying Lower Torque Rod Mounting Bolt**

29. Remove the lower radiator hose (A) from the radiator hose stay (B).

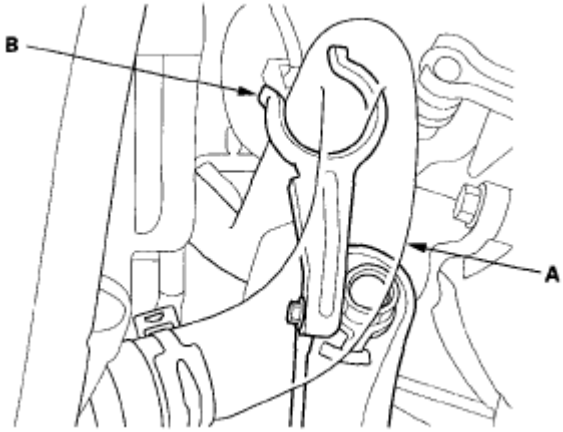



**Fig. 81: Identifying Lower Radiator Hose From Radiator Hose Stay**

30. Remove the lower engine mounting bolt (A) while holding the nut (B) with a wrench and discard it.

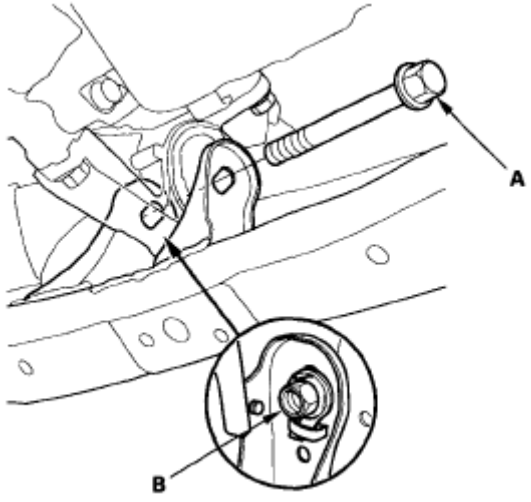



**Fig. 82: Identifying Lower Engine Mounting Bolt**

31. Remove the front subframe front mounting bolts (A) from the right and left sides of the vehicle, and discard them.

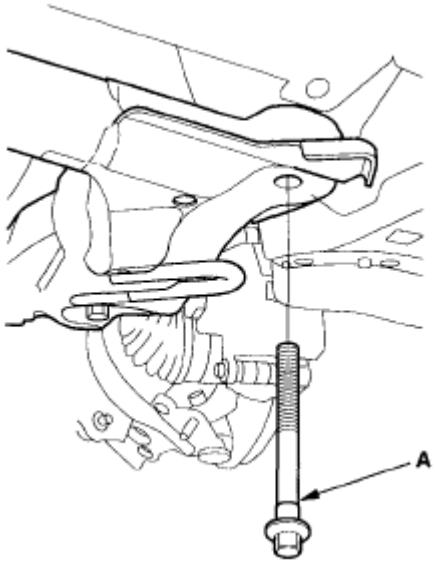



**Fig. 83: Identifying Front Subframe Front Mounting Bolts**

32. Remove the front subframe rear mounting bolts (A) from the right and left sides of the vehicle, and discard them.

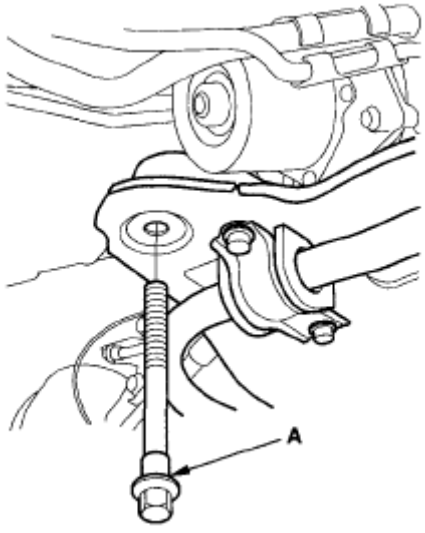



**Fig. 84: Identifying Front Subframe Rear Mounting Bolts From Right And Left Sides Of Vehicle**

33. Lower the front subframe and steering gearbox as an assembly by lowering the jack slowly.
34. Remove the harness clamp bracket (A) from the front subframe, then remove

the harness clips (B).

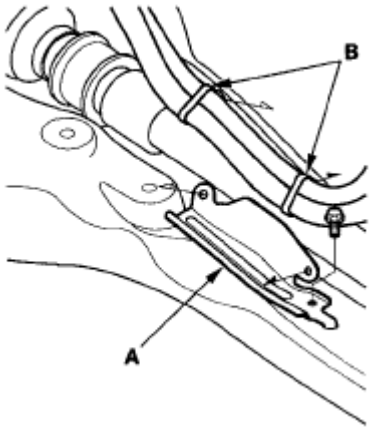



**Fig. 85: Identifying Harness Clamp Bracket From Front Subframe**

35. Remove the torque sensor 4P connector (A), motor angle sensor 6P connector (B), motor 1P connector (C) and motor 2P connector (D) from the right side of the gearbox mounting bracket (E).

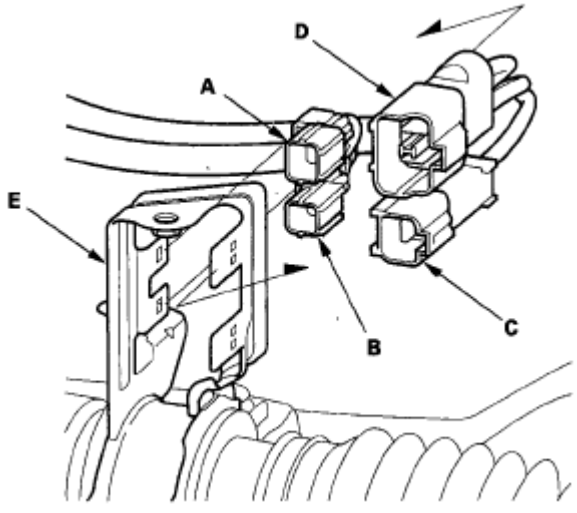



**Fig. 86: Identifying Torque Sensor 4P Connector Motor Angle Sensor 6P Connector**

36. Remove the pinion shaft grommet (A) from the top of the torque sensor.

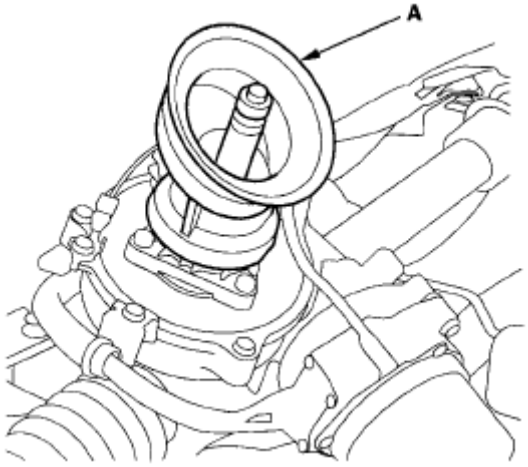



**Fig. 87: Identifying Pinion Shaft Grommet (A) From Top Of Torque Sensor**

37. Remove the two 10 mm bolts from the right side of the steering gearbox, then remove the gearbox mounting bracket (A) and the mounting cushion (B).

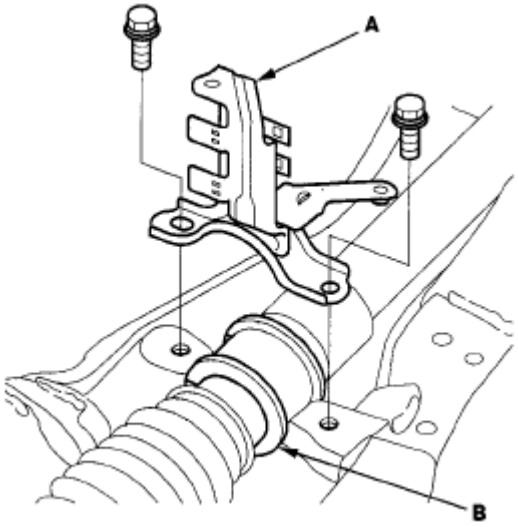



**Fig. 88: Identifying Steering Gearbox**

38. Remove the four 10 mm flange bolts from the left side of the steering gearbox, then remove the stiffener plates (A).

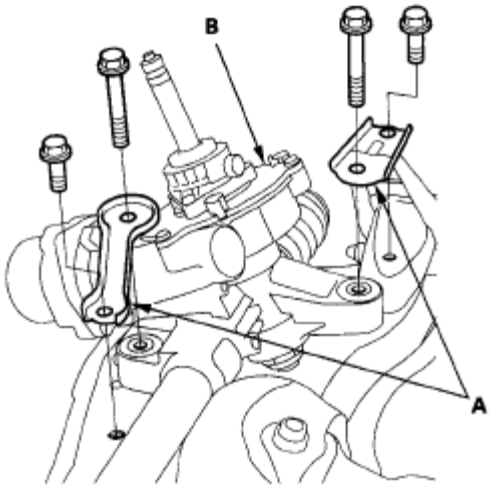



**Fig. 89: Identifying Steering Gearbox**

39. Remove the steering gearbox (B) from the front subframe.

**Installation**

1. Place the steering gearbox in position on the front subframe.
2. Loosely install the stiffener plates (A) and the gearbox mounting bolts on the left side of the steering gearbox.

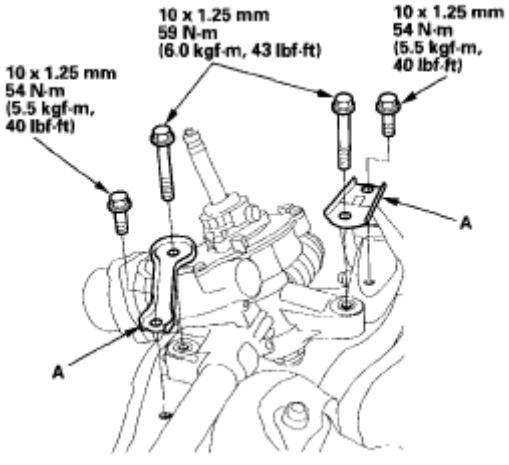



**Fig. 90: Identifying Stiffener Plates (A) And Gearbox Mounting Bolts (With Torque Specifications)**

3. Position the cutout (A) on the mounting cushion (B) as shown, and install it on the right side of the steering gearbox securely.

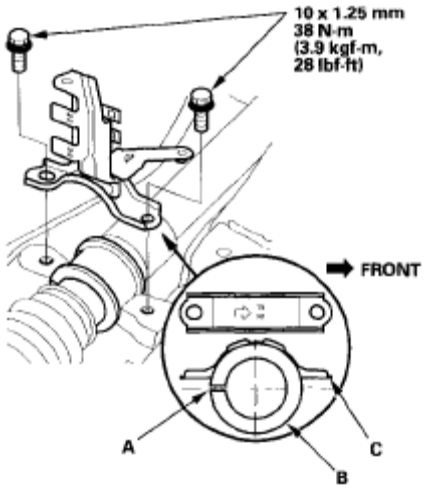



**Fig. 91: Identifying Cutout (A) On Mounting Cushion (With Torque Specifications)**

4. Install the gearbox mounting bracket (C) over the mounting cushion, and loosely install the two 10 mm bolts.
5. Tighten the 10 mm bolts on both sides of the steering gearbox to the specified torque alternately in two or more steps.
6. Install the pinion shaft grommet (A). Align the slot in the pinion shaft grommet with the lug portion (B) on the torque sensor. The grommet must not have a gap at the mating surface of the grommet and the torque sensor.

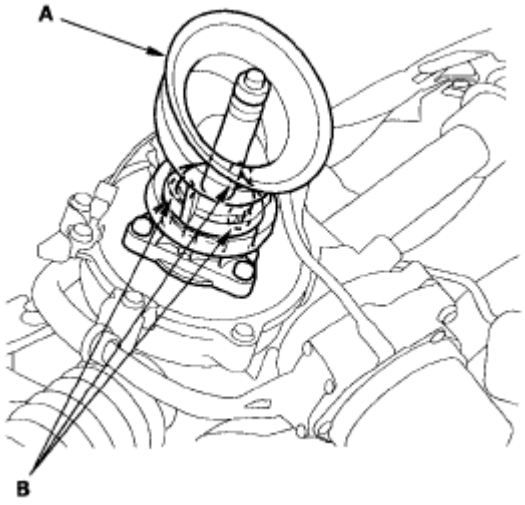



**Fig. 92: Identifying Pinion Shaft Grommet (A)**

7. Install the torque sensor 4P connector (A), motor angle sensor 6P connector (B), motor 1P connector (C), and motor 2P connector (D) on the right side of the gearbox mounting bracket (E).

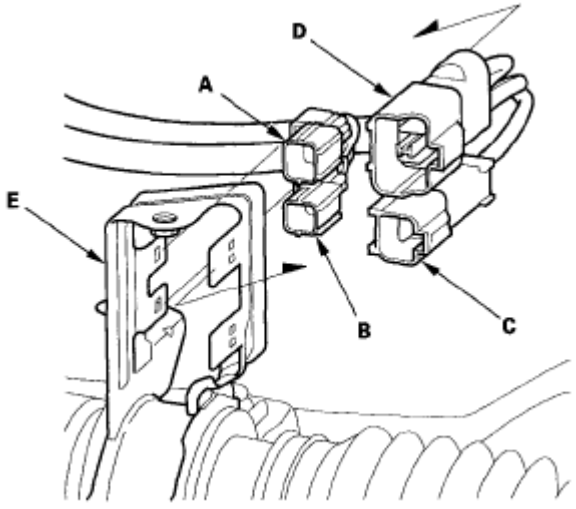



**Fig. 93: Identifying Gearbox Mounting Bracket**

8. Install the harness clips (A) to the harness clamp bracket (B), then install the harness clamp bracket to the front subframe.

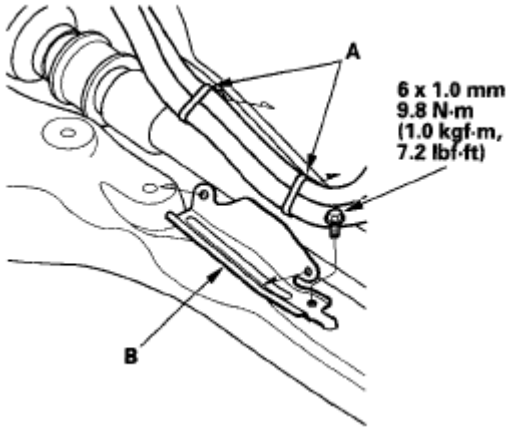



**Fig. 94: Identifying Harness Clamp Bracket (With Torque Specifications)**

9. Carefully raise the front subframe with the front subframe adapter and the transmission jack or the powertrain lift until the subframe is in position, then loosely install new subframe mounting bolts.

**NOTE: Be sure that the pinion shaft grommet is in place securely. Check whether the pinion shaft grommet is not turning up. Incorrect installation can cause leakage of water, mud, and noise.**

10. Align the front subframe reference marks (A) to the body (B), as noted during removal.

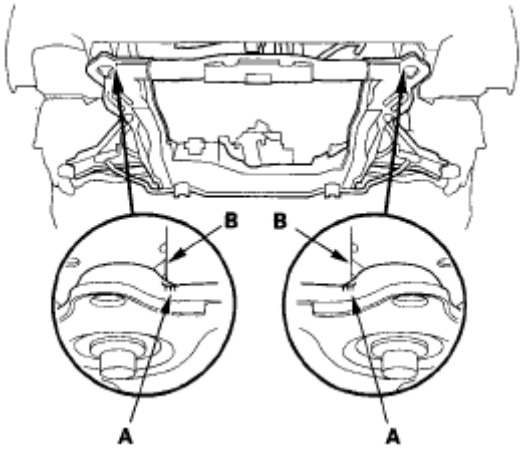



**Fig. 95: Identifying Front Subframe Reference Marks To Body**

11. Tighten the new front subframe rear mounting bolts (A) to the specified torque.

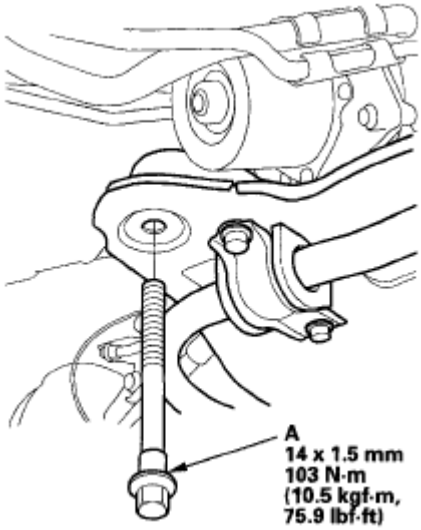



**Fig. 96: Identifying Front Subframe Rear Mounting Bolts (With Torque Specifications)**

12. Tighten the new front subframe front mounting bolts (A) to the specified torque.

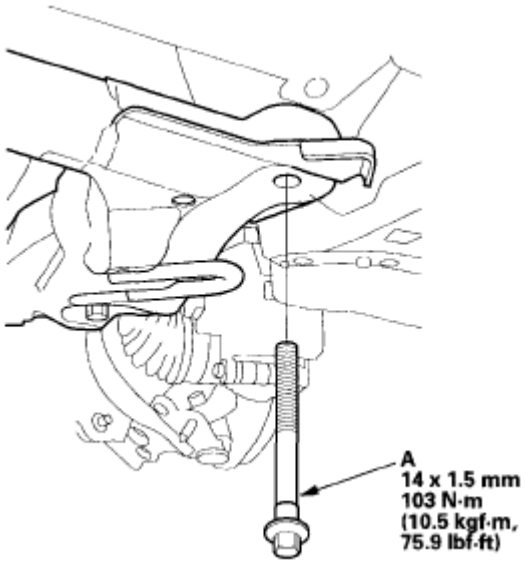



**Fig. 97: Identifying Front Subframe Front Mounting Bolts (With Torque Specifications)**

13. Install the new lower engine mounting bolt (A) while holding the nut (B) with a wrench.

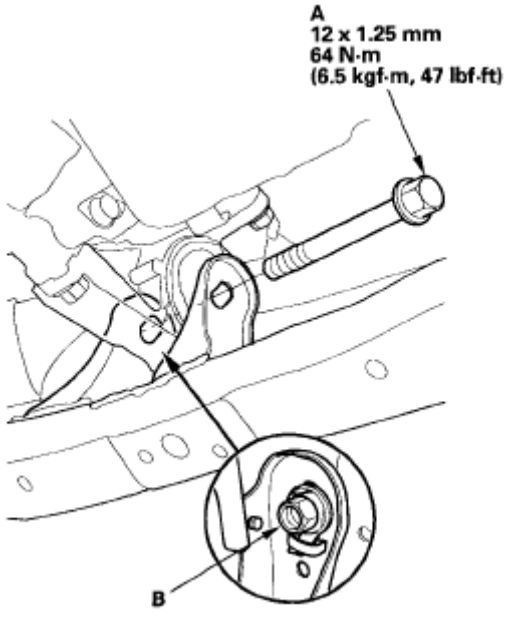



**Fig. 98: Identifying Lower Engine Mounting Bolt (With Torque**

**Specifications)**

14. Install the lower radiator hose (A) to the radiator hose stay (B).

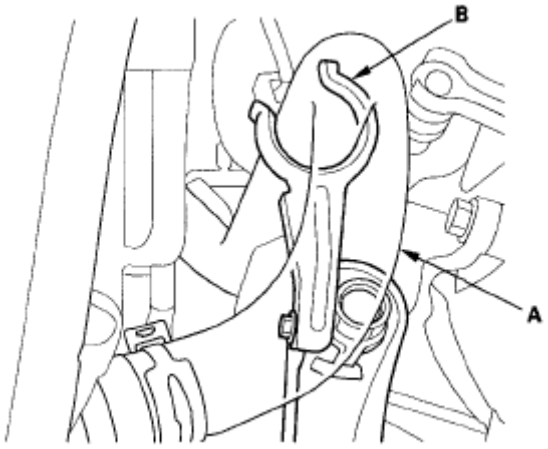



**Fig. 99: Identifying Lower Radiator Hose (A) To Radiator Hose Stay**

15. Install the new lower torque rod bracket bolt (A) and tighten it to the specified torque.

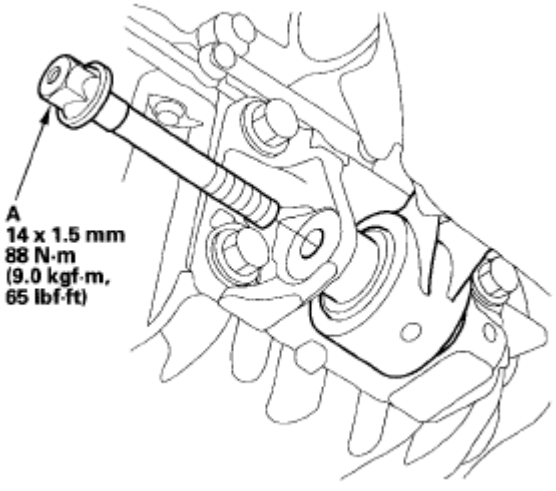



**Fig. 100: Identifying Lower Torque Rod Bracket Bolt (With Torque Specifications)**

16. Install the new front subframe middle mount bolt (A) on the left side, and tighten it to the specified torque.

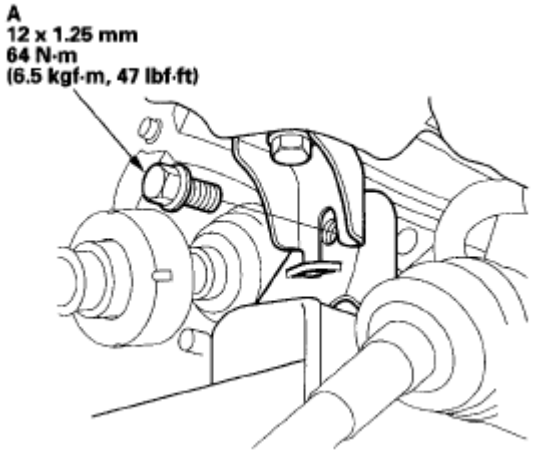



**Fig. 101: Identifying Front Subframe Middle Mount Bolt (A) On Left Side (With Torque Specifications)**

17. Install the new front subframe middle mount bolt (A) on the right side, and tighten it to the specified torque.

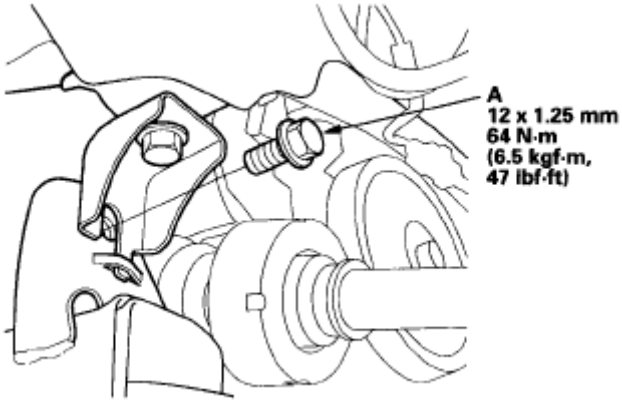



**Fig. 102: Identifying Front Subframe Middle Mount Bolt (With Torque Specifications)**

18. Install the exhaust hanger (A) to the three way catalytic converter (TWO (B).

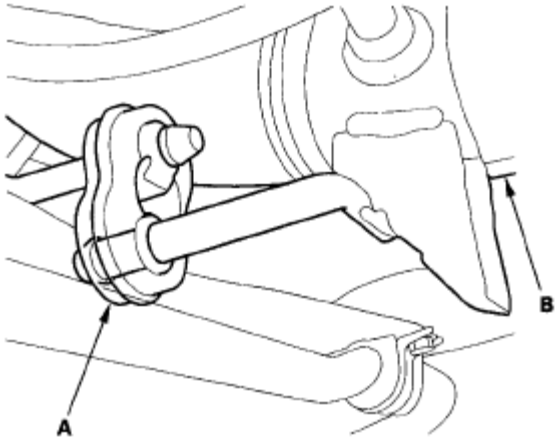



**Fig. 103: Identifying Exhaust Hanger (A) To Three Way Catalytic Converter**

19. Connect the lower arm (A) to the lower ball joint (B).

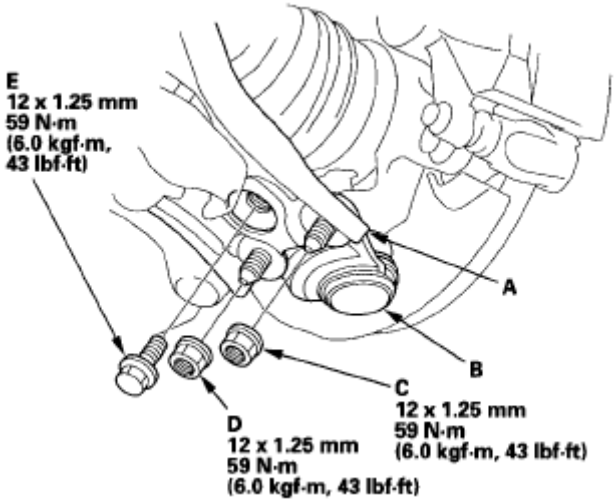



**Fig. 104: Identifying Lower Arm (A) To Lower Ball (With Torque Specifications)**

20. Install a new flange bolt and the new flange nuts. After lightly tightening all three fasteners, tighten them to the specified torque in the following order; the flange nut on the front (C), the flange nut on the rear (D), then the flange bolt (E).
21. Remove the vinyl tape, then connect the torque sensor 4P connector (A), motor angle sensor 6P connector (B), motor 1P connector (C), and motor 2P connector (D) to the steering gearbox. Make sure to push these connectors until

you hear a click so that the connectors are secured.

**Fig. 105: Connecting Torque Sensor 4P Connector**

22. Install the front splash shield (see **FRONT SPLASH SHIELD REPLACEMENT** ).
23. Wipe off any grease contamination from the ball joint tapered section and the threads. Reconnect the tie-rod ends (A) to the steering knuckles. Install the 12 mm nut (B), and tighten it.

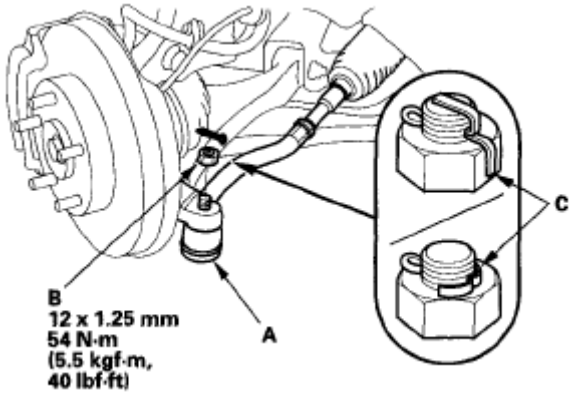



**Fig. 106: Identifying Front Splash Shield**

24. Install the new cotter pin (C), and bend it as shown.
25. Center the steering rack within its stroke in the steering joint connection.
26. With the rack in the straight ahead driving position, cut the wire (A) and slip the lower end of the steering joint onto the pinion shaft (B) in the range shown.

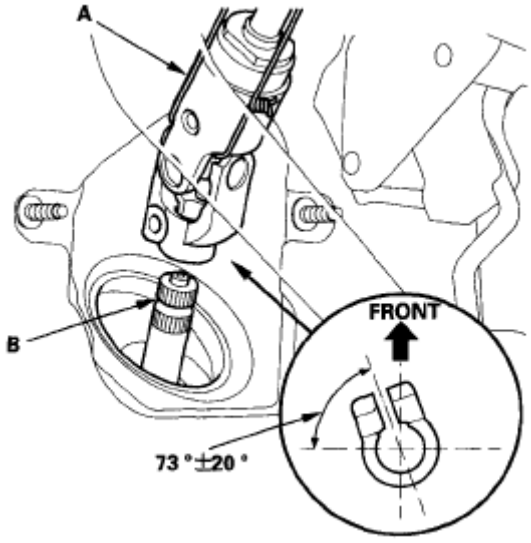



**Fig. 107: Identifying Center Steering Rack**

27. Align the bolt hole (A) on the steering joint with the groove (B) around the pinion shaft, and loosely install the joint bolt (C). Be sure that the joint bolt is securely in the groove in the pinion shaft. Pull on the steering joint to make sure that the steering joint is fully seated. Tighten the steering joint bolt to the specified torque.

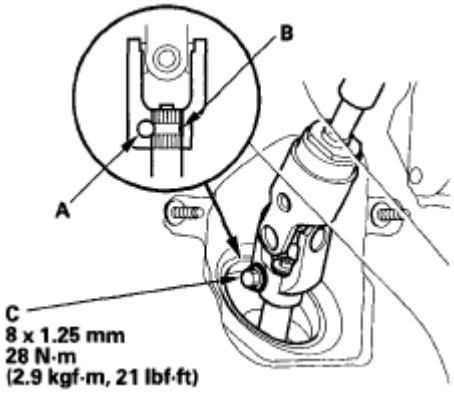



**Fig. 108: Identifying Steering Joint With Groove (B) Around Pinion Shaft (With Torque Specifications)**

28. Install the steering joint cover (A).

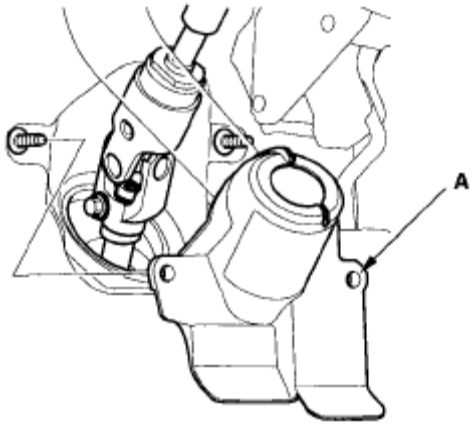



**Fig. 109: Identifying Steering Joint Cover (A)**

29. Install the driver's dashboard under cover (see **DRIVER's DASHBOARD UNDERCOVER REMOVAL/INSTALLATION** ).
30. Install the front wheel, then set the wheels in the straight ahead position.
31. Install the steering wheel (see **STEERING WHEEL INSTALLATION** ).
32. Holding the tires raised off the ground (lifted up), check for the following symptoms by turning the steering wheel fully to the right and left several times.

**SYMPTOM PROBABLE CAUSE REFERENCE**

| Symptom | Probable cause |
|---|---|
| Rubbing sound coming from the lower steering column area. | Steering column joint is contacting the cover. |
| Grating sound from the lower steering column area, or a rough feeling during steering. | Poor engagement of the pinion shaft serrations. |
| Noise from around the steering wheel during steering. | Poor engagement of the SRS cable reel with the steering wheel, or a damaged cable reel. |

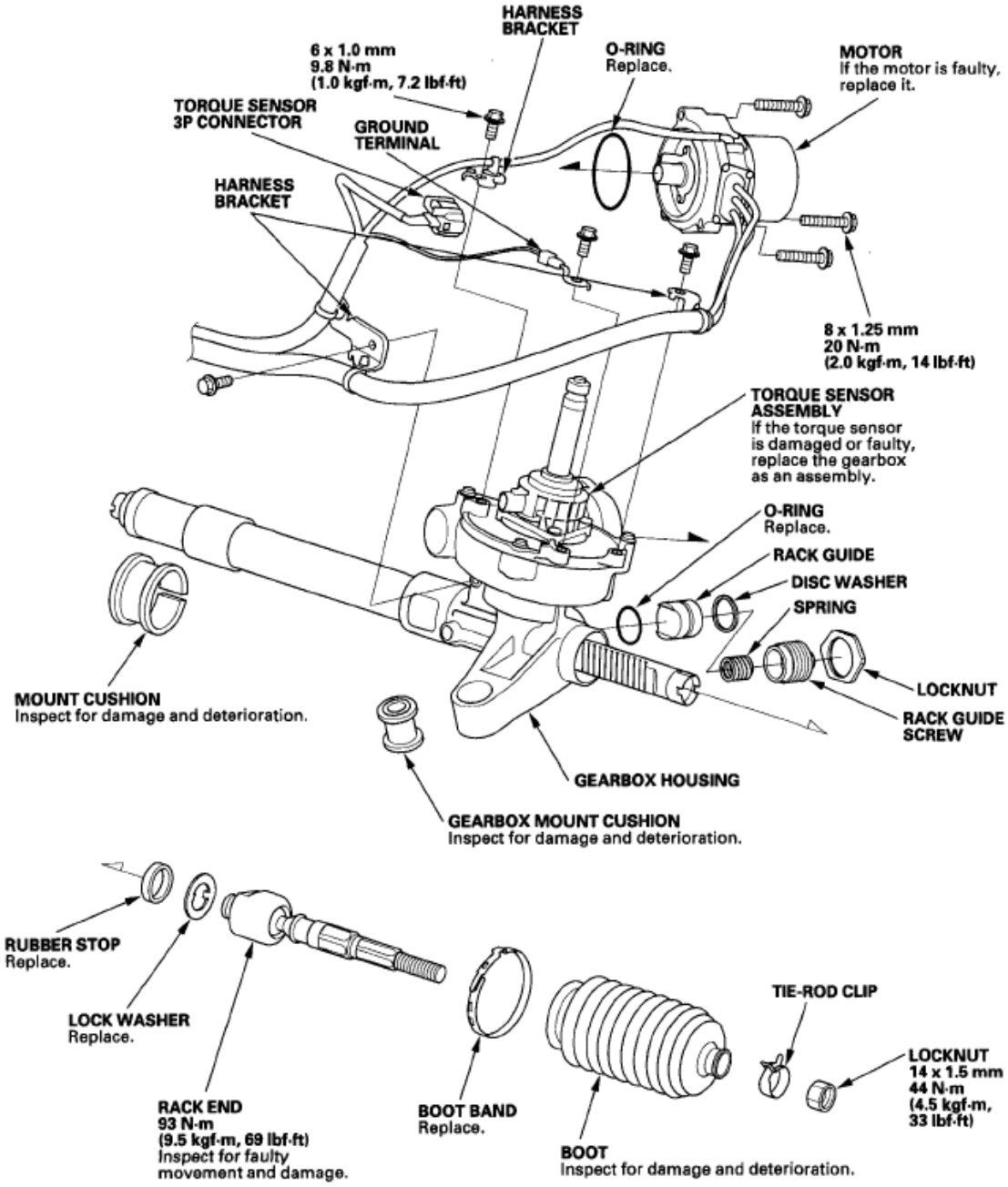
33. Install the air cleaner housing (see **AIR CLEANER REMOVAL/INSTALLATION** ).
34. Install the under cowl panel (see **FRONT GRILLE COVER REPLACEMENT** ).
35. Reconnect the negative cable to the battery and do these items:

- Turn the ignition switch ON (II); the SRS indicator should come on for about 6 seconds and then go off.
- Enter the anti-theft code for the audio or navigation system, then enter the audio presets.
- Set the clock.
- Make sure the horn and turn signal switch work properly.
- Make sure the steering wheel switches work properly.
- Make sure the steering wheel is centered.
- Do the memorizing the torque sensor neutral position (see **MEMORIZING THE TORQUE SENSOR NEUTRAL POSITION** ).

36. After installation, do the following checks:
    - Start the engine, and let it idle. Turn the steering wheel from lock-to-lock several times. Check that the EPS indicator does not come on.
    - Check the steering wheel spoke angle. If steering spoke angles to the right and left are not equal (steering wheel and rack are not centered), correct the engagement of the joint/pinion shaft serrations, then adjust the front toe by turning the tie-rod ends, if necessary.
    - Check the front toe inspection (see **FRONT TOE INSPECTION/ADJUSTMENT** ).

## RACK END REMOVAL AND INSTALLATION

**EXPLODED VIEW**




## Fig. 110: Exploded View Of Rack End Components (With Torque Specifications)

**Removal**

**NOTE: Do not allow dust, dirt, or other foreign materials to enter the steering gearbox.**

1. Remove the boot bands (A) and discard them. Remove the tie-rod clips (B), and pull the boots away from the ends of the steering gearbox.

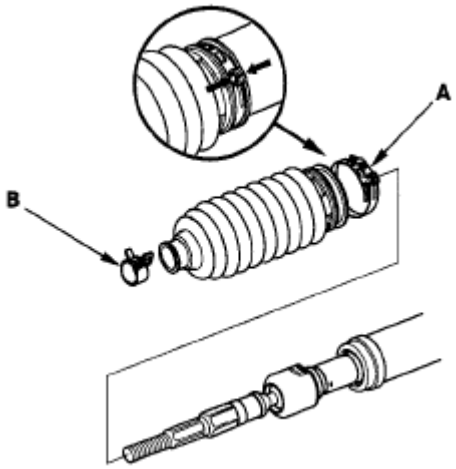



**Fig. 111: Identifying Boot Bands**

2. Unbend the lock washer (A).

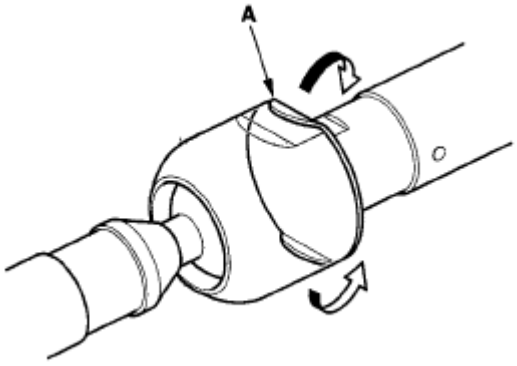



**Fig. 112: Identifying Unbend Lock Washer (A)**

3. Unscrew both rack ends (A) with a wrench. Be careful not to damage the rack shaft surface with the wrench. Remove the lock washer (B) and rubber stop (C) and discard them.

**NOTE: Hold the flat surfaces of the rack shaft on the pinion shaft side with another wrench.**

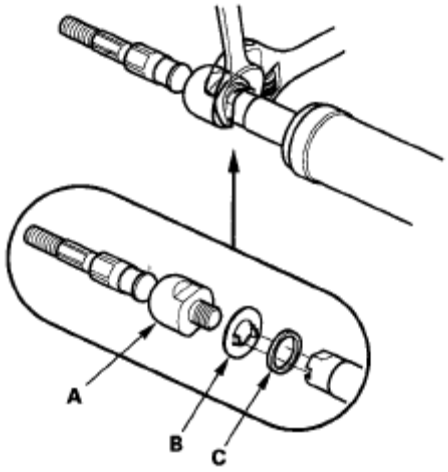



**Fig. 113: Identifying Rack Shaft On Pinion Shaft**

**Installation**

1. Install the new rubber stop (A) and lock washer (B) on the rack shaft. Align the lock washer tabs (C) with the slots (D) in the rack shaft. Install the rack end (E) while holding the lock washer in place. Repeat this step for the other side of the rack shaft.

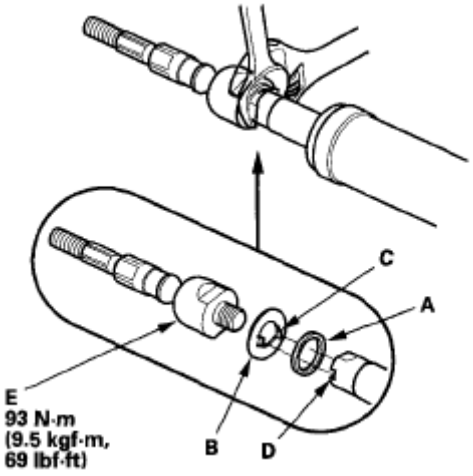



**Fig. 114: Identifying Rubber Stop (A) And Lock Washer (B) On Rack Shaft (With Torque Specifications)**

2. Tighten both rack ends. Be careful not to damage the rack shaft surface with the wrench.
3. Bend the lock washer (A) back against the flat spots (B) on the rack end ball

joint housing.

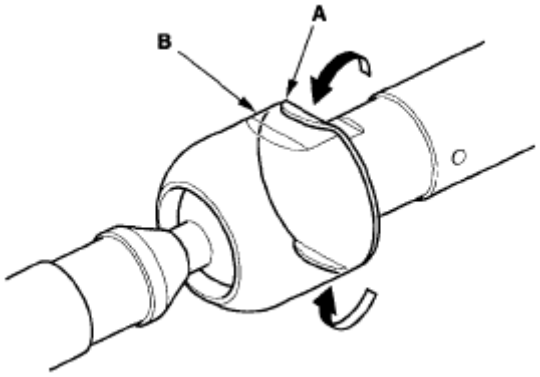



**Fig. 115: Identifying Lock Washer (A) Back Against Flat Spots (B) On Rack End Ball Joint Housing**

4. Apply multipurpose grease to the circumference of the rack end joint housing (A) and lock washer.

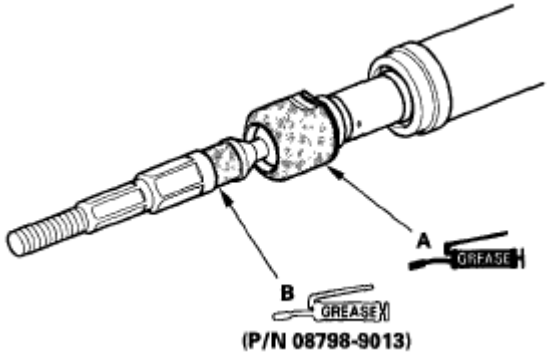



**Fig. 116: Identifying Multipurpose Grease To Circumference Of Rack End Joint Housing (A) And Lock Washer**

5. Apply a light coat of silicone grease (P/N 08798-9013) to the boot fitting grooves (B) on the rack ends.
6. Center the steering rack within its stroke.
7. Clean off any grease or contamination from the boot installation grooves (A) on the gearbox housing. Install the boots (B) on the rack ends with the tie-rod clips (C), and fit the boot end in the installation grooves in the housing properly.

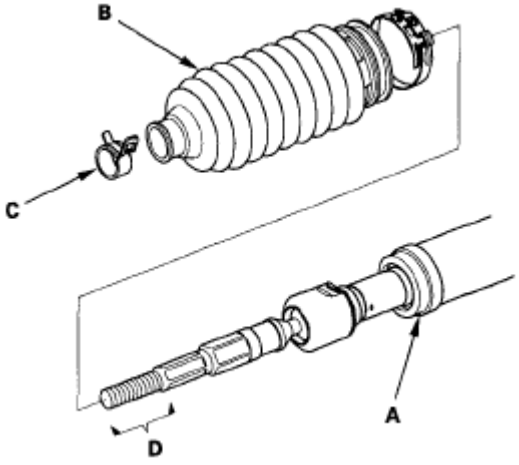



**Fig. 117: Identifying Steering Boot**

8. After installing the boots, wipe the grease off the thread section (D) of the rack end.
9. Install the new boot bands by aligning the tabs (A) with the holes (B) of the band.

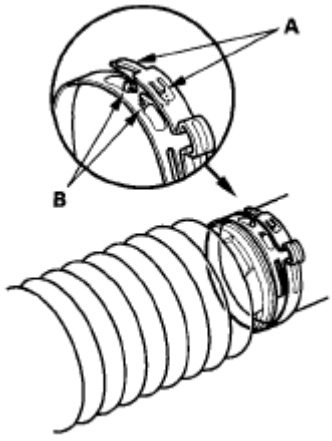



**Fig. 118: Identifying Boot Bands**

10. Close the ear portion (A) of the band (B) with commercially available pincers, Oetiker 1098 or equivalent (C).

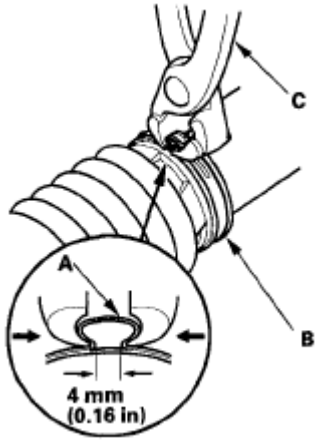



**Fig. 119: Identifying Pincers**

11. Slide the rack shaft right and left to be certain that the boots are not deformed or twisted.

## GEARBOX MOUNT CUSHION REPLACEMENT

1. Remove the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).
2. Position the 34 mm socket wrench (A) on the flange part of the gearbox housing with a washer (B), 10 x 105 mm flange bolt (C) and the 10 mm nut (D) as shown.

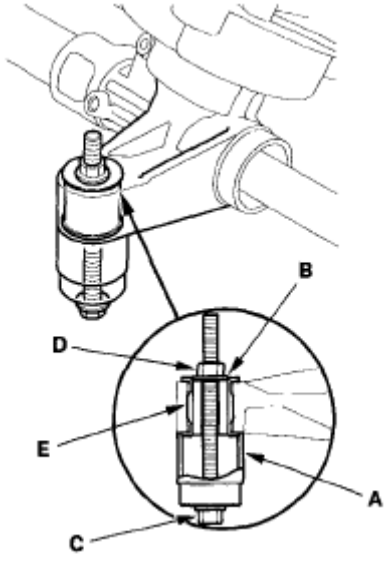



**Fig. 120: Identifying Steering Gearbox**

3. Hold the 10 mm nut with a wrench, and tighten the 10 x 105 mm flange bolt with another wrench. Remove the gearbox mount cushion (E).
4. Apply a mild soap and water solution to the new gearbox mount cushion surface (A), then place the mount cushion on the gearbox mounting cushion hole.

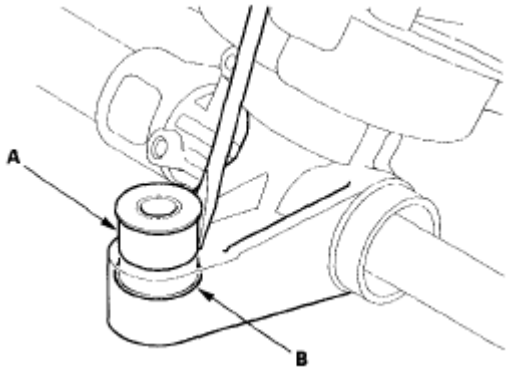



**Fig. 121: Identifying Water Solution To Gearbox Mount Cushion Surface**

5. Using a flat-tipped screwdriver, push the edge of the mount cushion (B) until it is about 1/3 of the way into the gearbox housing.

**NOTE: Be careful not to damage the surface of the mount cushion when pushing it with the flat-tipped screwdriver.**

6. Position the 34 mm socket wrench on the flange part of the gearbox housing with a washer, flange bolt, and the nut as shown.
7. Install the gearbox mount cushion by tightening the nut until the mount cushion edges (A) properly fit on the gearbox flange surface.

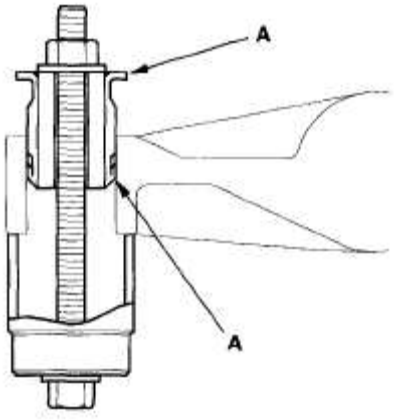



**Fig. 122: Identifying Gearbox Mount Cushion**

8. Install the steering gearbox (see **INSTALLATION** ).
9. Check the wheel alignment, and adjust it if necessary (see **WHEEL ALIGNMENT** ).

## RACK GUIDE REMOVAL/INSTALLATION

Note these items during removal/installation: Do not allow dust, dirt, or other foreign materials to enter the steering gearbox.

1. Remove the steering gearbox (see **STEERING GEARBOX REMOVAL AND INSTALLATION** ).
2. Loosen the locknut (A), then remove the rack guide screw (B), spring (C), disc washer (D), and rack guide (E).

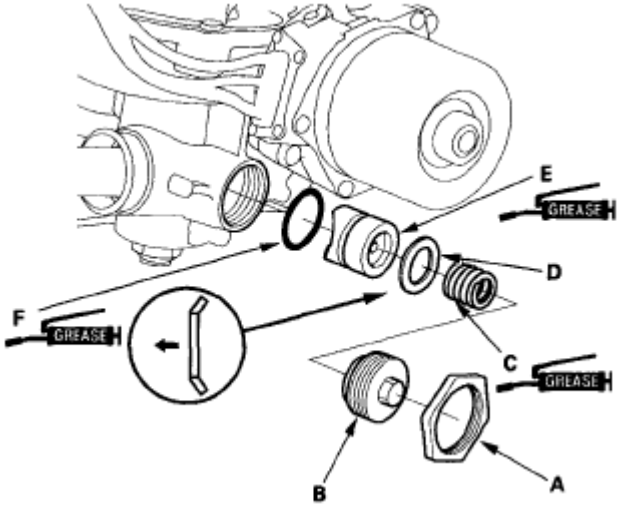



**Fig. 123: Identifying Steering Gearbox Components**

3. Remove the O-ring (F) from the rack guide. Wipe the grease off the sliding surface of the rack guide.
4. Apply multipurpose grease to the new O-ring, then install it to the rack guide.
5. Apply multipurpose grease to the sliding surface and the circumference of the rack guide, and install it onto the gearbox housing. Wipe the grease off the threaded section of the housing,
6. Apply multipurpose grease to both ends of the spring, and install it onto the gearbox housing.
7. Install the disc washer with its convex side facing the rack guide.
8. Remove the old sealant from the rack guide screw and apply new sealant (Three Bond 1215 or Loctite 5699) to the middle of the threads. Loosely install the rack guide screw on the steering gearbox.
9. Loosely install the locknut.
10. Adjust the rack guide screw (see **EPS TYPE** ). After adjusting, check that the rack moves smoothly by sliding the rack right and left.

## EPS CONTROL UNIT REMOVAL/INSTALLATION

1. Make sure you have the anti-theft codes for the audio or navigation system, then write down the audio presets.
2. Make sure the ignition switch is OFF, then disconnect the negative cable from

the battery.

3. Remove the passenger's dashboard under cover (see **PASSENGER's DASHBOARD UNDERCOVER REMOVAL/INSTALLATION** ).
4. Remove the passenger's side kick panel: 2-door (see **TRIM REMOVAL/INSTALLATION - DOOR AREAS** ), 4-door (see **FRONT DOOR SILL AREA - 4-DOOR** ).
5. Disconnect EPS control unit connector A (2P), connector B (2P), connector C (2P), and connector D (28P).

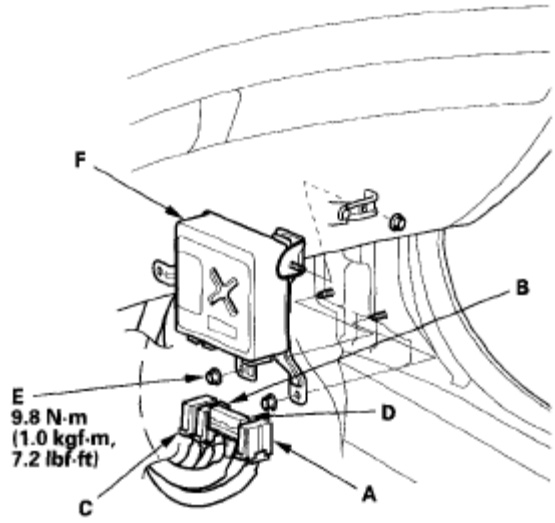



**Fig. 124: Identifying EPS Control Unit Connector**

6. Remove the nuts (E) from the EPS control unit (F).
7. Remove the EPS control unit.
8. Install the EPS control unit in the reverse order of removal.
9. Reconnect the negative cable to the battery and do these items:
   - Enter the anti-theft code for the audio or navigation system, then enter the audio presets.
   - Set the clock.
   - If the EPS control unit is replaced, the EPS control unit must memorize the torque sensor neutral position (see **MEMORIZING THE TORQUE SENSOR NEUTRAL POSITION** ).
10. After installation, start the engine, and let it idle. Turn the steering wheel from

lock-to-lock several times. Check that the EPS indicator does not come on.